UNIVERSITY OF HAWAI'I LIBRARY

Rhodora

JOURNAL OF THE
NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by
MERRITT LYNDON FERNALD, Editor-in-Chief
CHARLES ALFRED WEATHERBY
ALBERT FREDERICK HILL
STUART KIMBALL HARRIS
} Associate Editors

Vol. 47. August, 1945. No. 560.

CONTENTS:

Jussiaea uruguayensis in Staten Island, New York.
Joseph Monachino. 237

Contributions from the Gray Herbarium of Harvard University—CLVII. *M. L. Fernald.* I. Key to Antennaria of the "Manual Range" (continued). II. Transfers in and Animadversions on Artemisia. III. Senecio congestus. 239

Filago arvensis in North America. *George A. Hardy.* 258

Injury to Herbarium-Specimens by extreme Heat.
M. L. Fernald. 258

Bingham's Flora of Oakland County, Michigan (Review).
C. A. Weatherby 260

The New England Botanical Club, Inc.
8 and 10 West King St., Lancaster, Pa.
Botanical Museum, Oxford St., Cambridge 38, Mass.

RHODORA.—A monthly journal of botany, devoted primarily to the flora of the Gray's Manual Range and regions floristically related. Price, $4.00 per year, net, postpaid, in funds payable at par in United States currency in Boston; single copies (if available) of not more than 24 pages and with 1 plate, 40 cents, numbers of more than 24 pages or with more than 1 plate mostly at higher prices (see 3rd cover-page). Volumes 1–9 can be supplied at $4.00, 10–34 at $3.00, and volumes 35–46 at $4.00. Some single numbers from these volumes can be supplied only at advanced prices (see 3rd cover-page). Somewhat reduced rates for complete sets can be obtained on application to Dr. Hill. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be considered for publication to the extent that the limited space of the journal permits. Forms may be closed five weeks in advance of publication. Authors (of more than two pages of print) will receive 15 copies of the issue in which their contributions appear, if they request them when returning proof. Extracted reprints, if ordered in advance, will be furnished at cost.

Address manuscripts and proofs to
M. L. Fernald, 14 Hawthorn Street, Cambridge 38, Mass.

Subscriptions (making *all remittances* payable to RHODORA) to

Dr. A. F. Hill, 8 W. King St., Lancaster, Pa., or, preferably, Botanical Museum, Oxford St., Cambridge 38, Mass.

Entered as second-class matter March 9, 1929, at the post office at Lancaster, Pa., under the Act of March 3, 1879.

INTELLIGENCER PRINTING COMPANY
Specialists in Scientific and Technical Publications
EIGHT WEST KING ST., LANCASTER, PA.

EDIBLE WILD PLANTS OF EASTERN NORTH AMERICA

by MERRITT LYNDON FERNALD and ALFRED CHARLES KINSEY

Practical discussion of edibility and directions for recognition and preparation of more than 1000 wild plants. 422 pp., introd. and detailed index, 124 line drawings, 25 half-tone plates. $3.00, postpaid. THE IDLEWILD PRESS, Cornwall-on-Hudson, New York, or Librarian, GRAY HERBARIUM, Cambridge 38, Mass.

MEMOIRS OF THE GRAY HERBARIUM. A series of illustrated quarto papers issued at irregular intervals, sold separately

No. I. A Monograph of the Genus Brickellia, by B. L. Robinson. 150 pp., 96 fig. 1917. $3.00.

No. III. The Linear-leaved North American Species of Potamogeton, Section Axillares, by M. L. Fernald. 183 pp., 40 plates, 31 maps. 1932. $3.00.

No. IV. The Myrtaceous Genus Syzygium Gaertner in Borneo, by E. D. Merrill and L. M. Perry. 68 pp. 1939. $1.50.

No. V. The Old World Species of the Celastraceous Genus Microtropis Wallich, by E. D. Merrill and F. L. Freeman. 40 pp. 1940. $1.00.

Gray Herbarium of Harvard University, Cambridge 38, Mass.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 47. August, 1945. No. 560.

JUSSIAEA URUGUAYENSIS IN STATEN ISLAND, NEW YORK

Joseph Monachino

On Sept. 17, 1944, the writer discovered a large showy colony of Primrose-Willow in a pond located about 100 yards north of the corner of Richmond Valley Rd. and Arthur Kill Rd., Staten Island, Richmond Co., New York. The pond is a permanent one, apparently, and consists of fresh water separated from the Arthur Kill by a narrow stretch of sand; it is quite removed from immediate habitation. An area of several hundred feet of shore around this pond was densely populated with *Jussiaea*, which waded out into the water some two or three feet deep and formed an almost exclusive stand. Its only associate represented in an appreciable number was *Glyceria obtusa.*

The *Jussiaea* was extensively creeping, the flowering stems erect with the flowers large and striking (the fugacious petals about 2.5 cm. long and 1.5 cm. broad). The leaves on the upright stems were elliptic or lanceolate, narrowed at both ends, usually 5–9 cm. long inclusive of the petiole, 1–2 cm. broad; bracteoles lanceolate, about 1.5–1.6 mm. long; capsules 1.5–2 cm. long and 3–4 mm. diam. The plants were moderately to sparsely pilose, except for the calyx-tube which was rather densely so. A careful survey indicated this pubescence character to be quite uniform in all the plants examined.

On Dec. 3 of the same year the writer revisited the *Jussiaea* station. The aerial stems of the plants were completely withered, while the creeping rhizomes and shoots submerged beneath the frozen surface of the pond were in full vigor and with bright green leaves. Matured fruits were scarce.

The species has been known as *Jussiaea grandiflora* Michx., and it is given this name by Muenscher in his recent (1944) "Aquatic Plants of the United States." Hassler (Fedde Rep. Sp. Nov. **12:** 276. 1913) placed *J. grandiflora* in synonymy of *J. repens* L. subsp. *hirsuta* Hassler var. *grandiflora* (Michx.) Hassler. From the interpretation presented by P. A. Munz (Studies in *Onagraceae* XII. A Revision of the New World Species of *Jussiaea.* Darwiniana **4** (2–3): 190, 268, 269. 1942) the identity of our plant is *J. uruguayensis* Camb. var. *genuina* Munz. Concurring with Hassler in recognizing a very close affinity between the *repens* and the *grandiflora* elements, this authority stated that *J. uruguayensis* "is very near to *J. repens* and perhaps doubtfully distinct."

Search of literature failed to disclose any record of *J. uruguayensis* north of North Carolina. In the herbarium of the N. Y. Bot. Gd. there is a specimen of this species, ex herb. C. D. Lippincott, of a plant which grew in a garden from root originally brought from South Carolina by C. Williamson; coll. Lippincott, Swedesboro, N. J., 9–10–1900. (Identification confirmed by Munz.) The northernmost station for the species (var. *genuina*) cited by Munz in Darwiniana is from near Wilmington, N. Carolina.

M. L. Fernald (RHODORA **46:** 197. 1944) reports *Jussiaea Michauxiana* Fernald, which is a new name for *J. grandiflora* Michx. (not Ruiz & Pavon), as locally abundant on stream-banks in Berks County, Pennsylvania, where it was discovered by H. Wilkens in 1941. This plant was identified by Munz as *J. uruguayensis.* Subsequently, a second sheet of the same species, labeled *J. uruguayensis,* was sent to the Gray Herbarium, this collected by W. C. Brumbach at another station in Berks County, Pennsylvania. M. L. Fernald maintains these collections of *J. Michauxiana* as distinct from true *J. uruguayensis.* In a personal communication, Prof. Fernald kindly informed the writer that there is no doubt about the identity of his plant from Staten Island and that the eastern Pennsylvania species is not like it.

The 1867 edition of Gray's Manual notes *J. repens* as naturalized near Philadelphia. Munz cites several collections of *J.*

repens var. *glabrescens* Kuntze from the vicinity of Philadelphia: "New Jersey, Camden, *Parker in 1870, in 1866.* Pennsylvania, Philadelphia, without collector's name; Delaware Co., Hog Island, *Fogg 9775.*"

A letter was sent by the writer to William T. Davis inquiring about any possible information on the establishment of *Jussiaea* in Richmond Co., but he received the sad news from Mr. Coles, the Director of the S. I. Institute of Arts and Sciences, that the venerable authority on Staten Island had recently died. The query was transferred to Mr. Ellison, President of the Bird and Nature Club of Staten Island, who reported that none of the members of the club had observed *Jussiaea uruguayensis.*

Vouchers (*Monachino 427*) for the subject of the present discussion are deposited in the Gray Herbarium and the New York Botanical Garden.

NEW YORK BOTANICAL GARDEN

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLVII

M. L. FERNALD

I. KEY TO ANTENNARIA OF THE "MANUAL RANGE"

(*Continued from page 235*)

26. A. FARWELLII Greene, Pittonia, iii. 347 (1898); Fernald in RHODORA, xxxviii. 230, t. 433, fig. 3 (1936). Very local, Bruce Pen., Ont., and Keweenaw Co., Mich. Staminate plant unknown. June, early July.

27. A. MUNDA Fernald, l. c. 229, t. 433, figs. 1 and 2 (1936). *A. occidentalis* sensu Robinson & Fernald in Gray, Man. ed. 7, 821, fig. 879 (1908), not Greene. Centr. Me. to Thunder Bay Distr., Ont., s. to Mass., Ct., N. Y., e. Va. (local), W. Va., n. Ind., Wisc. and Minn. Staminate plant very rare. Mid-May–mid-June.

28. A. FALLAX Greene, Pittonia, iii. 321 (1898); Fernald in RHODORA, i. 74 (1899). *A. arnoglossa,* var. *ambigens* Greene, Pittonia, iii. 320 (1898). *A. Parlinii,* var. *ambigens* (Greene) Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 244 (1898). *A. ambigens* (Greene) Fernald in RHODORA, i. 150 (1899). *A. plantaginifolia,* var. *ambigens* (Greene) Cronquist, l. c. 183 (1945). Centr. Me. to s. Ont. and Minn., s. to Va., Tenn., Ark. and e. Tex. Staminate plants abundant southw. and westw., rare northeastw. April–July. PLATES 945 and 946.

Var. calophylla (Greene) Fernald, l. c. xxxviii. 230 (1936). *A. calophylla* Greene, Pittonia, iii. 347 (1898). Ga. to Tex., n. to s. Md., Va., s. Mich., s. Ill. and Mo. Plates 947 and 948.

29. A. Parlinii Fernald in Gard. and For. x. 287 (1897), in Asa Gray Bull. v. 92, t. 2, figs. 1–5 (1897) and in Proc. Bost. Soc. Nat. Hist. xxviii. 243 (1898). Western N. B. and se. Me. to s. Ont., s. to Ga., O., Ind., Ill. and Ia. Staminate plants freq. southw. and westw., rare northeastw. April–early June. Plates 949 and 950.

Var. arnoglossa (Greene) Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 244 (1898); Rhodora, i. 151 (1899). *A. arnoglossa* Greene, Pittonia, iii. 318 (1898). *A. plantaginifolia*, var. *arnoglossa* (Greene) Cronquist, l. c. (1945). Similar range, s. to N. C., Tenn. and Mo. Late March–early June. Plate 951.

30. A. Brainerdii Fernald in Rhodora, i. 153 (1899). W-centr. Me. to Ont., s. to Ct., N. Y., mts. of Va., and n. Mich. Staminate plant unknown. Mid-May–mid-June. Plates 952 and 953.

31. A. plantaginifolia (L.) Hook. Fl. Bor.-Am. i. 330 (1834), as to basonym only; Greene, Pittonia, iii. 173 (1897). *Gnaphalium plantaginifolium* L. Sp. Pl. 850 (1753), typified by the Plukenet plant but excluding the Gronovian, which belongs to the next species. *G. plantagineum* L. Syst. ed. 12: 545 (1767), with same description, with phrases rearranged, as of his *G. plantaginifolium* (1753), therefore an illegitimate substitute. *G. dioicum*, β. *plantaginifolium* (L.) Michx. Fl. Bor.-Am. ii. 128 (1803) as to basonym and as to plant "corymbo", not as to plant "unifloro; flore manifeste majore". *A. plantaginea* (L.) R. Br. in Trans. Linn. Soc. xii. 123 (1818); Richardson in Append. Frankl. Narr. ed. 2: 758–repr. 30 (1823)—Richardson often erroneously given as author of the combination *A. plantaginifolia*, including later auth., for instance Fernald in Asa Gray Bull. v. 92, t. 2, fig. 6 (1897), the fig. showing the Plukenet type, and in Proc. Bost. Soc. Nat. Hist. xxviii. 242 (1898). *Disynanthus* Raf. in Am. Mo. Mag. ii. 268 (1818), undefined generic name based on the confused *Gnaphalium plantaginifolium* L. *Disynanthus plantagineus* (L.) Raf. ex Jackson in synonymy in Ind. Kew. fasc. ii. 782 (1893), this illegitimate combination based on an illegitimate (substitute) name united with a nonvalid (undefined) generic name for a wholly mixed basic specific concept (great work!). *A. decipiens* Greene, Pittonia, iii. 278 (1898). Sw. Me. to Minn., s. to Ga., Ala. and Mo. Staminate and pistillate plants abundant. April–June. Plates 954 and 955. Passing into

Var. petiolata (Fernald) Heller, Muhlenbergia, i. 5 (1900). *A. plantaginea*, var. *petiolata* Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 242 (1898). Sw. Me. to e. N. Y., s., locally, to Va. Plate 956.

32. A. SOLITARIA Rydb. in Bull. Torr. Bot. Cl. xxiv. 304 (1897). *Gnaphalium plantaginifolium* L. Sp. Pl. 850 (1753) as to description in part and including the Gronovian *Gnaphalium stolonibus reptatricibus longissimis, foliis ovatis, caule capitato* (our PLATE 957). *G. dioicum*, β. *plantaginifolium* (L.) Michx. Fl. Bor. Am. ii. 128 (1803) in part, the plant "caule breviore, unifloro; flore manifeste majore . . . in occidentalibus *Alleghanis* montibus". *A. plantaginifolia*, β. *monocephala* Torr. & Gray, Fl. ii. 431 (1843). *Gnaph. monocephalum* Carpenter ex Torr. & Gray, l. c. in synonymy (1843). *A. monocephala* (Torr. & Gray) Greene, Pittonia, iii. 176 (1897), not DC. (1837). Md. and w. Pa. to Ind., s. to Ga., Ala. and La. Staminate and pistillate plants about equally abundant. April, May. PLATES 957 and 958.

Although *Antennaria solitaria* was not at first specifically separated from the utterly different *A. plantaginifolia*, as typified by Plukenet's plant, it was well known to Clayton and Gronovius, as well as to Linnaeus. Those who are familiar with the plant could scarcely confuse it with anything else. Nevertheless, this was done until Michaux in 1803 commented on it as a variation but without formally separating it. Cronquist, in the most recent discussion of the genus (preceding the present one) concedes that the two species which were elements of the Linnean *Gnaphalium plantaginifolium* are really distinct species, *A. solitaria*, "the single-headed southern plant with certain [unstated] habital peculiarities". He admits just one more species in all our diversified area, *A. neglecta*, which, like *A. solitaria*, has flagelliform stolons. When, in forma *simplex*, *A. neglecta* puts its whole vigor into one exceptionally large head, as in Peck's original material (our PLATE 927) of what avail are the "certain habital peculiarities" without the technical morphological ones, especially when the rosette-leaves of *A. neglecta* are 1.5–6.5 cm. long and up to 1.3 cm. broad (PLATE 925), while those of *A. solitaria* are 2–8 cm. long and, in the smaller specimens, down to only 1.5 cm. broad (PLATE 958, FIG. 2)? The treatment of eastern North American *Antennaria* of two centuries ago was inadequate and confused. The latest student of the genus in our area, although not reuniting it with *Gnaphalium*, has otherwise got back essentially to the pre-Linnean stage. As Mary, Queen of Scots, is reputed to have said when her regal career was coming to its tragic conclusion, "In my end is my beginning".

I was once told, by one whose voluminous errors were too apparent, that I should not "knock" the assertive errors of men younger than myself; that I should expect them not to get many of their facts straight. When, however, a comparative beginner on our eastern flora urges me to see through the press his characterization, as "too dependent on temporary whim", of my species, which have been defined after intensive field- and herbarium-study over a period of a third of a century, it is surely not unreasonable to expect him to show evidence of at least an elementary understanding of the very numerous characters of our eastern species. It must be assumed, apparently, that his very off-hand reduction of one of the few plants which fully satisfies his theoretical requirement (abundance of both sexes) for a species, Stebbins's presumably ancestral *A. virginica* of the ancient Appalachian Upland, and the reduction of or complete ignoring of my 11 described species from Gaspé County, Quebec, westward and southward—it must be assumed that, if he fails to uphold such a theoretically ideal species as *A. virginica*, he would similarly wipe out of consideration the embarrassing scores of species known, locally, from Newfoundland to Greenland and across boreal America and defined by Ostenfeld, Ekman, the Porsilds, Malte, Polunin and, obviously, myself. It is well to be forewarned of their impending doom and to prepare to lie down and meekly to watch them degraded!

In view of the actual situation in *Antennaria* and that in *Hieracium*, Cronquist's warning that "The chaotic condition which has been brought about in some European genera that also show well-developed apomixis, such as *Hieracium*, should give pause to those who have so multiplied our species", is worth a moment's consideration. There seems here to be an assumption that the behavior of apomicts in *Antennaria* and *Hieracium* (perhaps also *Taraxacum*) is comparable. It is, but certainly not identical nor very similar. Those who have lived and explored all their lives in eastern North America are painfully aware of the dominating aggressiveness and rampageous destructiveness, beginning in the late '70's and expanding almost daily in the open season, of the small host of apomicts in *Hieracium* from the very modern flora of Europe, the various species known as King Devil, Devil's Paint-brush and other equally contemptuous names. They also know that, except for occasional crossing of *H. Gronovii* or *H. scabrum* with *H. venosum*, our native *Hieracia* are relatively well-behaved. Similarly the mass of inextricable apomicts known as *Taraxacum officinale* Weber [I was in error when I identified them with *T. palustre* (Sm.) Blytt] are among the most aggressive of all our weeds; but how many of our eastern botanists know the strictly indigenous and morphologically very definite species of our area: *T. phymatocarpum*, *T. ceratophorum*, *T. laurentianum*. *T. dumetorum* or *T. Longii?* Very few, because they are conservative and local species which have to be sought; they do not intrude upon us like the more familiar apomicts of the genus or of *Hieracium*. Now, in *Antennaria* our nonapomictic species, *A. virginica* (PLATE 937), *A. neglecta* (PLATES 924–926), *A. plantaginifolia* (PLATES 954–956) and *A. solitaria* (PLATES 957 and 958), for example, are abundant and as nearly dominating as any members of the genus with us; but, as compared with the apomictic *Pilosella* group of *Hieracium* or the heteromorphic apomicts of *Taraxacum officinale*, they are shy and retiring amateurs. And, whereas the endless apomicts in European *Hieracium* and in the European *Taraxacum officinale* bunch are unrestrainedly aggressive, the unisexual (apomictic) *Antennarias* are local and relatively rare and usually highly selective as to habitat: *A. columnaris*, a species with remarkable individuality and with corollas only 4 mm. long, the achenes 1.2 mm. long, known only on the barrens at the base of Pointe Riche in Newfoundland, there associated with the utterly different *A. Foggii*, unique in having the outer phyllaries agglutinated and thus forming a falsely gamophyllous cup, the corollas 5–5.5 mm. long and the achenes 1.7 mm. long; *A. vexillifera* (PLATE 913), discussed on p. 224, one of the tiniest of species, with 4–6 of the cauline leaves terminated by broad pennant-like scarious appendages 1.5–3 mm. long, known only from an alpine barren in Gaspé and similar barrens in Newfoundland; *A. subviscosa* (PLATES 916 and 917), discussed on p. 225, forming dense carpet-like mats (with crowded trailing branches up to 5 dm. long and heavily covered with marcescent leaves) on the calcareous north-facing cliffs near the lower St. Lawrence from Rimouski Co. to Gaspé Co., Quebec, the upper nodes of the stem and the inflorescence viscid, the cauline leaves with subulate or involute (instead of flat and pennant-like) tips, the viscid pale involucres often pink-tinged. Other chiefly pistillate but sometimes staminate species, like *A. canadensis* (PLATES 922 and 923), *A. petaloidea* (PLATES 940–944) and *A. munda*, occur over broader ranges; while species such as *A. Parlinii* (PLATES 949–951) and *A. fallax* (PLATES 945 and 946), abundantly bisexual southward or westward but wholly or chiefly pistillate northeastward, are as wide-spread as any. If there is a universal rule for apomicts, *Hieracium*, *Taraxacum* and *Antennaria* do not make it perfectly clear.

EXPLANATION OF PLATES 912–958

PLATE 912. ANTENNARIA EUCOSMA Fernald, all figs. from TYPE-series: FIGS. 1 and 2, a pistillate and a staminate plant, × 1; FIG. 3, pistillate involucre, × 6; FIG. 4, a single pistillate flower, × 10; FIG. 5, pistillate corollas, × 10; FIG. 6, achene, × 10.

PLATE 913. A. VEXILLIFERA Fernald: FIG. 1, pistillate plant, × 1, from TYPE-series; FIG. 2, basal rosette, × 5, from Boat Harbor, Straits of Belle Isle, Newfoundland, *Fernald, Wiegand & Long*, no. 29,172; FIG. 3, tip of cauline leaf, × 10, from Cook Point, Pistolet Bay, Newfoundland, *Fernald & Gilbert*, no. 29,171; FIG. 4, inflorescence, × 2, from no. 29,171; FIG. 5, involucre, × 6, from TYPE; FIGS. 6 and 7, pistillate corollas and achenes, × 10, from Eastern Point, St. John Bay, Newfoundland, *Fernald, Long & Fogg*, no. 2085.

PLATE 914. A. STRAMINEA Fernald: FIGS. 1 and 2, two plants, × 1, from TYPE-sheet; FIG. 3, portion of basal rosette, × 5, from TYPE; FIG. 4, tips of two cauline leaves, × 5, from St. John Island, St. John Bay, Newfoundland, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 29,170; FIG. 5, inflorescence, × 2, from no. 29,170; FIG. 6, involucre, × 5, from TYPE; FIGS. 7 and 8, corolla and achenes, × 10, from no. 29,170.

PLATE 915. A. PEASEI Fernald, all figs. from TYPE: FIG. 1, pistillate plant, × 1; FIG. 2, basal rosette, × 5; FIG. 3, tip of cauline leaf, × 10; FIG. 4, inflorescence, × 2.

PLATES 916 and 917. A. SUBVISCOSA Fernald: PLATE 916, small portion of one large plant, × 3/5, trailing down a limestone wall, Bic, Quebec, *Fernald & Collins*, no. 1195, part of TYPE (note marcescent old flowering stems), after photo. by *J. F. Collins*. PLATE 917, FIGS. 1 and 2, two small plants, × 1, from TYPE-series; FIG. 3, basal leaves, × 5, from TYPE; FIG. 4, tip of cauline leaf, × 10, from TYPE; FIG. 5, mature inflorescence, × 2, from Gros Morne, Gaspé Co., Quebec, *Fernald & Weatherby*, no. 2475; FIG. 6, involucre, × 6, from TYPE; FIGS. 7 and 8, corollas, × 10, and achenes, × 10, from Cap Pleureuse, Gaspé Co., Quebec, *Fernald, Weatherby & Stebbins*, no. 2474.

PLATE 918. A. ALBICANS Fernald: FIG. 1, group of plants, × 1, from TYPE-sheet; FIG. 2, basal rosettes, × 5, from TYPE; FIG. 3, tip of cauline leaf, × 10, from Eastern Point, St. John Bay, Newfoundland, *Fernald, Long & Fogg*, no. 2083; FIG. 4, inflorescence, × 2, from no. 2083; FIG. 5, pistillate flower, × 10, from TYPE; FIG. 6, achenes, × 10, from TYPE.

PLATE 919. A. WIEGANDII Fernald: FIG. 1, plant and basal rosette, × 1, from TYPE-sheet; FIG. 2, basal rosette, × 5, from Eastern Point, St. John Bay, Newfoundland, *Fernald, Long & Fogg*, no. 2098; FIG. 3, inflorescence, × 2, from TYPE; FIG. 4, achenes, × 10, from TYPE.

PLATE 920. A. SPATHULATA Fernald: FIG. 1, two plants, × 1, from Table Mountain, Port-au-Port Bay, Newfoundland, *Fernald & St. John*, no. 10,870; FIG. 2, base, to show repent habit, × 1, from Pointe Riche, Newfoundland, *Fernald, Long & Fogg*, no. 2109; FIG. 3, portion of rosette-leaf, × 5, from no.

10,870; FIG. 4, inflorescence, × 2, from Pointe Riche, *Fernald & Wiegand*, no. 4143; FIG. 5, portion of involucre, × 5, from no. 10,870; FIG. 6, corollas, × 10, from St. John Island, St. John Bay, Newfoundland, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 29,183; FIG. 7, achenes, × 10, from no. 29,183.

PLATE 921. A. APPENDICULATA Fernald, all figs. from TYPE: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, upper half of rosette-leaf, × 5; FIG. 4, tip of cauline leaf, × 10; FIG. 5, corymb, × 2; FIG. 6, achenes, × 10.

PLATES 922 and 923. A. CANADENSIS Greene: PLATE 922, FIGS. 1 and 2, pistillate plant, × 1, from Franconia, New Hampshire, June 13, 1897, *Edwin Faxon;* FIG. 3, tip of cauline leaf, × 10, from same collection; FIG. 4, achenes, × 10, from St. Ours, Co. de Richelieu, Quebec, *Rolland-Germain*, no. 43,516. PLATE 923, FIG. 1, staminate plant, × 1, from Ile Perrot, Quebec, *Victorin*, no. 28,256; FIG. 2, basal leaves, × 5, from Manchester, Vermont, June 30, 1898, *Mary A. Day;* FIG. 3, corymb, × 2, from Masardis, Maine, *Fernald*, no. 2363.

PLATES 924–926. A. NEGLECTA Greene: PLATE 924, FIGS. 1 and 2, pistillate ISOTYPE, × 1; FIG. 3, tip of cauline leaf from ISOTYPE; FIG. 4, pistillate inflorescence, × 2, from Menands, Albany Co., New York, May 24, 1916, *House;* FIG. 5, pistillate inflorescence, × 2, from Brookland, D. C., May 2, 1900, *Holm.* PLATE 925, FIGS. 1 and 2, broad-leaved plant, × 1, from Ardsley, Montgomery Co., Pennsylvania, May 17, 1909, *B. Long;* FIG. 3, pistillate inflorescence, × 2, from southeast of Ligonier, Noble Co., Indiana, *Deam*, no. 27,459; FIG. 4, achenes, × 10, from Upland, Grant Co., Indiana, *Deam*, no. 15,779. PLATE 926, FIG. 1, staminate ISOTYPE; FIG. 2, tip of cauline leaf, × 10, from staminate ISOTYPE; FIG. 3, pistillate inflorescence, × 2, from Vaughan, New York, June 1, 1916, *Burnham;* FIG. 4, pistillate corolla, × 10, from no. 15,779.

PLATE 927. A. NEGLECTA, forma SIMPLEX (Peck) Fernald: ISOTYPE, × 1.

PLATE 928. A. CAMPESTRIS Rydb.: FIG. 1, pistillate plant, × 1, from Custer, South Dakota, *Rydberg*, no. 794 (PARATYPE-collection); FIG. 2, staminate plant, × 1, Deadwood, South Dakota, *E. J. Palmer*, no. 37,137; FIG. 3, tip of cauline leaf, × 10, from Charlot Pt., Lake Athabaska, Saskatchewan, *Raup*, no. 6079; FIG. 4, corymb, × 2, from no. 6079; FIG. 5, achenes, × 10, from Charlot Pt., *Raup*, no. 5283.

PLATES 929 and 930. A. RUPICOLA Fernald: PLATE 929, FIG. 1, base of one of TYPE-specimens, × 1; FIG. 2, rosette-leaves, × 5, from TYPE; FIG. 3, tip of cauline leaf, × 10, from TYPE. PLATE 930, FIG. 1, flowering summit of same plant as in plate 929, fig. 1; FIG. 2, corymb, × 2, from TYPE; FIG. 3, receptacle, × 10, from Grand Falls, Newfoundland, *Fernald, Wiegand, Bartram & Darlington*, no. 6344; FIG. 4, achenes, × 10, from same station and same collectors, no. 6343.

PLATES 931 and 932. A. NEODIOICA Greene, var. TYPICA Fernald: PLATE 931, FIGS. 1, 2 and 3, portions of ISOTYPE, × 1; FIG. 4, tip of rosette-leaf, × 5, from northeast of Wenksville, Adams Co., Pennsylvania, *L. F. A. Tanger*, no. 4383; FIG. 5, tip of cauline leaf, × 10, from ISOTYPE; FIG. 6, corymb, × 2, from Mickleton, Gloucester Co., New Jersey, *B. Long*, no. 20,454; FIG. 7, portion of involucre, × 5, from ISOTYPE. PLATE 932, FIGS. 1, 2 and 3, portions of staminate plants, × 1, from Frazer, Chester Co., Pennsylvania, May 7, 1910, *Bartram;* FIG. 4, pistillate corolla, × 10, from ISOTYPE; FIG. 5, achenes, × 10, from ISOTYPE.

PLATE 933. A. NEODIOICA, var. ATTENUATA Fernald: FIGS. 1 and 2, portions of TYPE, × 1; FIG. 3, tip of cauline leaf, × 10, from Orono, Maine, *Fernald*, no. 2356 (PARATYPE); FIG. 4, inflorescence, × 2, from no. 2356; FIG. 5, portion of involucre, × 5, from Sangerville, Maine, July 7, 1897, *Fernald* (PARATYPE).

PLATE 934. A. NEODIOICA, var. INTERJECTA Fernald, all figs. from TYPE: FIG. 1, small plant and base and inflorescence of others, × 1; FIG. 2, tips of rosette-leaves, × 5; FIG. 3, tip of cauline leaf, × 10; FIG. 4, corymb, × 2; FIG. 5, corollas, × 10; FIG. 6, achenes, × 10.

PLATE 935. A. NEODIOICA, var. CHLOROPHYLLA Fernald, all figs. from TYPE: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, tip of rosette-leaf, × 5; FIG. 4, involucre, × 5; FIG. 5, corolla, × 10.

PLATE 936. A. NEODIOICA, var. GRANDIS Fernald: FIGS. 1 and 2, portions of a plant, × 1, from South Ashburnham, Massachusetts, May 30, 1904, *F. F. Forbes;* FIG. 3, two mature corymbs, × 1, from Somesville, Maine, July 1, 1897, *E. L. Rand;* FIG. 4, corollas, and FIG. 5, achenes, from last collection.

PLATE 937, FIGS. 1–10. A. VIRGINICA Stebbins: FIGS. 1 and 2, pistillate, and 3 and 4, staminate plants (TYPE) × 1; FIG. 5, rosette-leaf, × 5, from TYPE; FIG. 6, tip of cauline leaf, × 10, from East Furnace, Shenandoah Co., Virginia, *Lena Artz*, no. 4; FIG. 7, involucre, × 5, from Hanging Rock, Hampshire Co., West Virginia, *W. M. Frye*, no. 4 (PARATYPE); FIG. 8, receptacle, × 10, from last no.; FIG. 9, pistillate corollas, × 10, from no. 4; FIG. 10, achenes, × 10, from no. 4.

PLATE 937, FIGS. 11 and 12. A. VIRGINICA, var. ARGILLICOLA Stebbins: FIG. 1, base of TYPE, × 1; FIG. 2, tip of cauline leaf, × 10, from TYPE.

PLATES 938 and 939. A. APRICA Greene: PLATE 938, FIG. 1, pistillate plant and corymbs, × 1, from near Deadwood, South Dakota, *E. J. Palmer*, no. 37,116; FIG. 2, pistillate corymb, × 2, from Perham, Ottertail Co., Minnesota, May 31, 1912, *Z. L. Chandonnet;* FIG. 3, pistillate flower and corolla, × 10, from Mouth of Qu'Appelle River, Manitoba, *Wm. Herriot*, Geol. Surv. Can., no. 72,845; FIG. 4, achenes, × 10, from no. 72,845. PLATE 939, FIG. 1, staminate plant, × 1, from Valentine, Nebraska, June 30, 1891, *J. M. Bates;* FIG. 2, basal rosette, × 5, from same specimen; FIG. 3, upper half of cauline leaf, × 10, from Perham, Minnesota, *Chandonnet;* FIG. 4, pistillate involucre, × 5, from *Herriot*, no. 72,845.

PLATES 940 and 941. A. PETALOIDEA Fernald (typical): PLATE 940, FIGS. 1, 2 and 3, portions of TYPE, × 1; FIG. 4, base of plant, to show repent habit, × 1, from Foxcroft, Maine, *Fernald*, no. 2390; FIG. 5, tip of cauline leaf, × 10, from TYPE; FIG. 6, half of corymb, × 2, from TYPE. PLATE 941, FIG. 1, staminate plant, × 1, from Harwich, Massachusetts, *Fernald*, no. 19,243; FIG. 2, tips of basal rosette, × 5, from Milo, Maine, Sept. 2, 1897, *Fernald;* FIG. 3, pistillate involucre, × 5, from TYPE; FIG. 4, pistillate corolla, × 10, from TYPE.

PLATE 942. A. PETALOIDEA, var. SCARIOSA Fernald: FIGS. 1 and 2, portions of TYPE, × 1; FIG. 3, corymb, × 2, from a TYPE-specimen; FIG. 4, exceptionally lax corymb, × 2, from TYPE-series; FIG. 5, involucre, × 5, from TYPE.

PLATES 943 and 944. A. PETALOIDEA, var. SUBCORYMBOSA Fernald: PLATE 943, FIGS. 1 and 2, portions of TYPE-series, × 1; FIG. 3, tip of cauline leaf, × 10, from TYPE; FIG. 4, involucre, × 5, from TYPE; FIG. 5, pistillate corollas, × 10, from near Charlottetown, Prince Edward Island, *Fernald & St. John*, no. 11,205; FIG. 6, achenes, × 10, from no. 11,205. PLATE 944, FIG. 1, portions of two large inflorescences, FIG. 2, summit of inflorescence at right, × 1, from Cemetery, Jordan Pond Road, Mt. Desert Island, Maine, June 4, 1901, *E. L. Rand.*

PLATES 945 and 946. A. FALLAX Greene: PLATE 945, pistillate plant: FIGS. 1 and 2, base and summit of flowering plant, × 1, from Chestnut Hill, Pennsylvania, May 3, 1889, *Heller;* FIG. 3, corymb, × 1⅞, from same collection; FIG. 4, achenes, × 10, from Ferrisburg, Vermont, *Eggleston*, no. 2645. PLATE 946, FIG. 1, staminate plant, × 1, from Agricultural College, Michigan, May 6, 1898, *C. F. Wheeler;* FIG. 2, involucre of pistillate head, × 6, from Chevy Chase Lake, Maryland, *Maxon & Standley*, no. 291; FIG. 3, pistillate corollas, × 10, from *Eggleston*, no. 2645.

PLATES 947 and 948. A. FALLAX, var. CALOPHYLLA (Greene) Fernald: PLATE 947: pistillate plant: FIGS. 1 and 2, portions of base and summit, × 1, of plant from Cape Girardeau, Missouri, *E. J. Palmer*, no. 39,081; FIG. 3, portion of involucre, × 6, from same no. PLATE 948, FIG. 1, staminate plant, × 1, an ISOTYPE from Cobden, Illinois, June 15, 1898, *E. L. Greene;* FIG. 2, pistillate inflorescence, × 1¾, from *E. J. Palmer*, no. 39,081.

PLATES 949 and 950. A. PARLINII Fernald: PLATE 949, pistillate plant: FIGS. 1 and 2, base and summit, × 1, of one of TYPE-specimens; FIG. 3, summit of flowering stem, to show dark glands, × 10, from Foxcroft, Maine, *Fernald*, no. 2340; FIG. 4, corymb, × 3, from TYPE; FIG. 5, achenes, × 10, from TOPO-

TYPE, June 5, 1897, *Parlin*. PLATE 950, FIGS. 1 and 2, staminate plant, × 1, from TYPE-locality, May 28, 1899, *Parlin;* FIG. 3, portion of pistillate involucre, × 6, from TOPOTYPE; FIG. 4, pistillate corollas, × 10, from TOPOTYPE.

PLATE 951. A. PARLINII, var. ARNOGLOSSA (Greene) Fernald: FIGS. 1 and 2, portion of base and summit, × 1, of ISOTYPE; FIG. 3, involucre, × 6, from ISOTYPE.

PLATES 952 and 953. A. BRAINERDII Fernald: PLATE 952, from ISOTYPE, Barber's Meadow, Addison, Vermont, May 27, 1899: FIGS. 1 and 2, base and summit of plant, × 1; FIG. 3, summit of stem, to show dark glands, × 10; FIG. 4, an inflorescence, × 6; FIG. 5, achenes, × 10. PLATE 953, FIG. 1, portion of base, showing unusually large leaves, × 1, from Mt. Battie, Camden, Maine, July, 1902, *G. G. Kennedy;* FIG. 2, loose pubescence of upper surface of rosette-leaf, × 10, from same specimen; FIG. 3, involucre, × 6, from TYPE; FIG. 4, corollas, × 10, from TYPE.

PLATES 954 and 955. A. PLANTAGINIFOLIA (L.) Hooker: PLATE 954, pistillate plant: FIGS. 1 and 2, base and summit of plant from type-region, × 1, west of Williamsburg, Virginia, *Grimes*, no. 2543; FIG. 3, involucre, × 6, from no. 2543; FIG. 4, corollas, × 10, from no. 2543. PLATE 955, FIG. 1, staminate plant from type-region, × 1, from west of Lake Matoka, James City Co., Virginia, *J. T. Baldwin*, no. 204; FIG. 2, inflorescence, × 6, from *Grimes*, no. 2543; FIG. 3, achenes, × 10, from no. 2543.

PLATE 956. A. PLANTAGINIFOLIA, var. PETIOLATA (Fernald) Heller, all figs. from TYPE-series: FIGS. 1 and 2, small fruiting plant, × 1; FIG. 3, staminate plant, × 1.

PLATES 957 and 958. A. SOLITARIA Rydberg: PLATE 957, FIG. 1, tracing, × 1, of the Gronovian element, of *Gnaphalium plantaginifolium* L., "Gnaphalium stolonibus reptatricibus longissimis, foliis ovatis, caule capitatis. *Gron. virg. 95*", after *B. L. Robinson;* FIG. 2, one of the TYPE-specimens (pistillate), × 1, of *A. plantaginifolia*, *β. monocephala* Torrey & Gray (basis of *A. solitaria*), coll. Louisiana, *Carpenter*. PLATE 958, FIG. 1, average plant (staminate), × 1, from Williamsburg, Virginia, *Fernald, Long & Abbe*, no. 14,241; FIG. 2, very small plant (staminate) × 1, from Chapel Hill, North Carolina, *Pease*, no. 26,998: FIG. 3, achenes, × 10, from north of Medora, Jackson Co., Indiana, *Deam*, no. 24,771.

II. TRANSFERS IN AND ANIMADVERSIONS ON ARTEMISIA

ARTEMISIA GLAUCA Pall., var. **dracunculina** (S. Wats.), comb. nov. *A. dracunculina* S. Wats. in Proc. Am. Acad. xxiii. 279 (1888). *A. Dracunculus* L., subsp. *dracunculina* (S. Wats.) Hall & Clements, Phylogen. Meth. in Taxon. 116 (1923). *A. dracunculoides* Pursh, var. *dracunculina* (S. Wats.) Blake in Journ. Wash. Acad. Sci. xxx. 472 (1940).

I get no satisfaction in trying to separate *Artemisia dracunculoides* Pursh (1814) from *A. glauca* Pallas (1804). At best they seem to be confluent forms of one species, the degree of pubescence or glabrousness and of glaucescence or greenness being most difficult to distinguish. Var. *dracunculina* is more tangible, with its loose inflorescence and nodding or pendulous long-pedicelled heads. In the type the filiform pedicels are 4–8 mm. long (Watson said "2 to 4 lines"), in *Hartman* no. 778, also from

Chihuahua, up to 9 mm., and extreme specimens, such as *J. H. Oyster*, no. 2 from Kansas, and *Bush*, no. 4121 from Greenwood, Missouri (distrib. as *A. mexicana* Willd.), have them (or the filiform minutely bracteate monocephalous branchlets) prolonged to 2–3.5 cm.!

Some botanists, overlooking the fact that the name *Artemisia glauca* Pall. (1804) antedates *A. dracunculoides* Pursh (1814), are using the combination *A. dracunculoides*, var. *glauca* (Pall.) Munz, Man. So. Cal. Bot. 575 and 601 (1935).

A. LUDOVICIANA Nutt., var. **cuneata** (Rydb.), stat. nov. *A. cuneata* Rydb. in N. Am. Fl. xxiv^3. 269 (1916).

A. LUDOVICIANA Nutt., var. **Brittonii** (Rydb.), stat. nov. *A. Brittonii* Rydb. in Bull. Torr. Bot. Cl. xxxii. 129 (1905).

A. LUDOVICIANA Nutt., var. **pabularis** (Nelson), comb. nov. *A. rhizomata* Nelson, var. *pabularis* Nelson in Bull. Torr. Bot. Cl. xxvii. 34 (1900). *A. pabularis* (Nelson) Rydb. in Bull. Torr. Bot. Cl. xxxiii. 137 (1906).

A. LUDOVICIANA Nutt., var. **americana** (Bess.), comb. nov. *A. vulgaris* L., var. *americana* Besser in Linnaea, xv. 105 (1841) in part.

A. LUDOVICIANA Nutt., var. **mexicana** (Willd.), comb. nov. *A. mexicana* Willd. ex Spreng. Syst. iii. 490 (1828). *A. indica* Willd., var. *mexicana* (Willd.) Besser in Nouv. Mém. Soc. Nat. Mosc. iii. 56 (1834). *A. vulgaris* L., var. *mexicana* (Willd.) T. & G. Fl. N. Am. ii. 421 (1843). *A. vulgaris*, subsp. *mexicana* (Willd.) Hall & Clements, Phylogen. Meth. Tax. 80 (1923) in part.

I get no intellectual satisfaction from the treatment of *Artemisia* by Hall & Clements. Although published under the sophisticated title "The Phylogenetic Method in Taxonomy", this treatment, it seems to me, does serious injury to sound taxonomy and its natural ally, sound phylogeny. My chief objection is, that fundamental characters in growth-habit, such as one would expect to be given real weight, were ignored or, apparently not recognized. Under the single blanket-name, *A. vulgaris*, Hall & Clements amassed plants of most diverse habit: species with rounded and deeply dissected leaves with stipule-like appendages at the base; others with comparable leaves but no appendages; species with strictly entire long-attenuate leaves, others with them variously dissected; species with heavy ligneous and non-stoloniferous crowns, others with herbaceous slender rhizomes and prolonged lash-like stolons; plants with densely tufted habit,

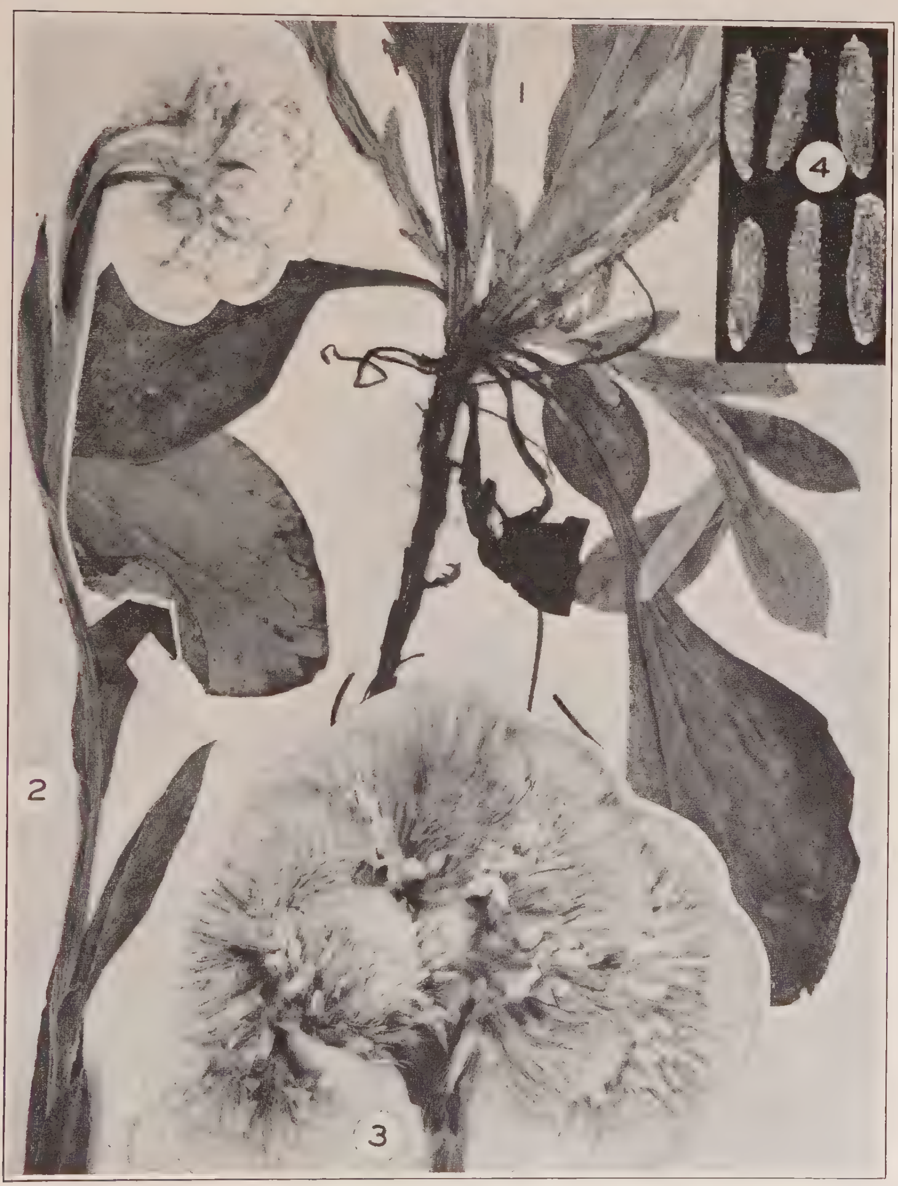

Photo. B. G. Schubert.

ANTENNARIA FALLAX: FIGS. 1 and 2, base and summit of pistillate plant, × 1; FIG. 3, corymb, × 2; FIG. 4, achenes, × 10.

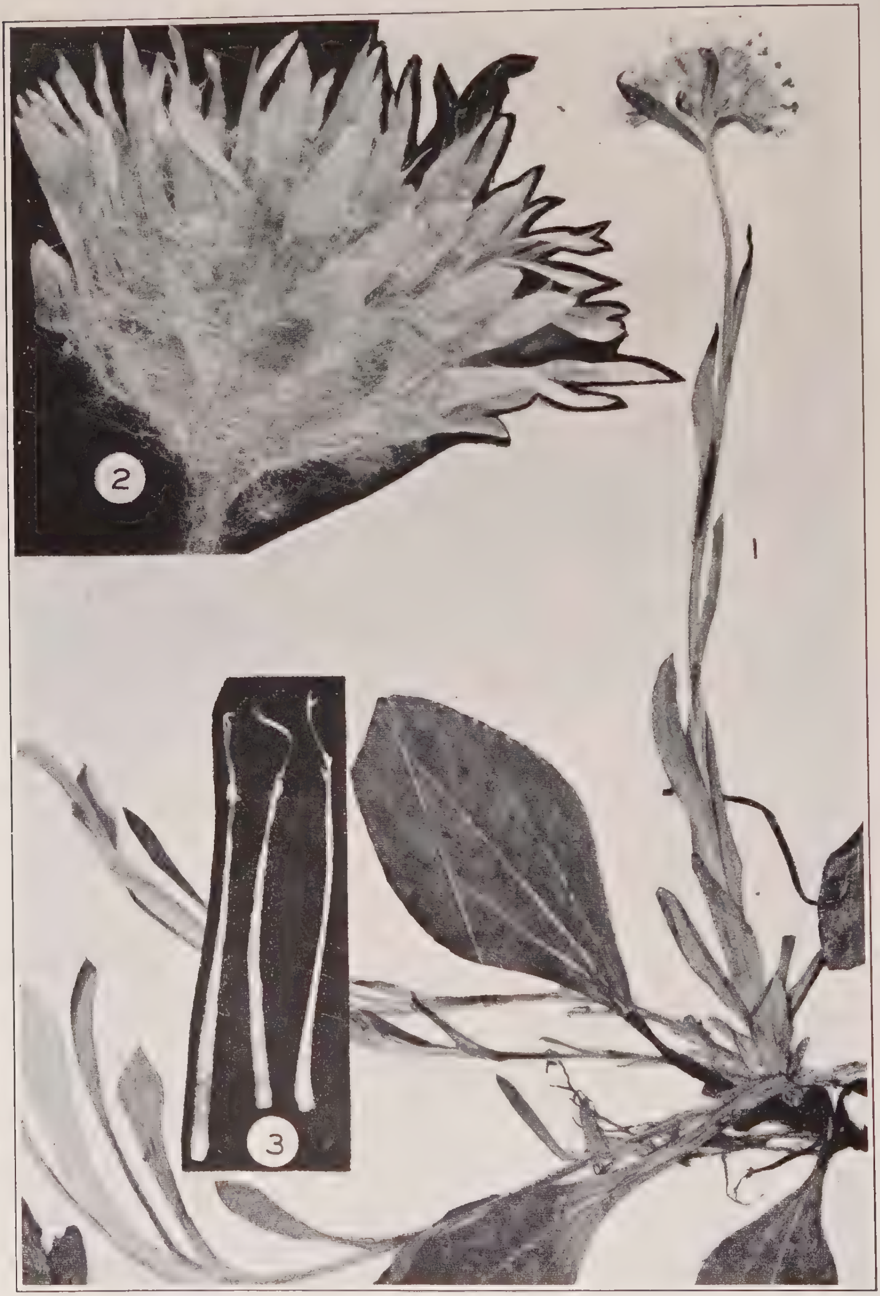

Photo. B. G. Schubert.

Antennaria fallax: fig. 1, staminate plant, × 1; fig. 2, pistillate involucre, × 5; fig. 3, pistillate corollas, × 10.

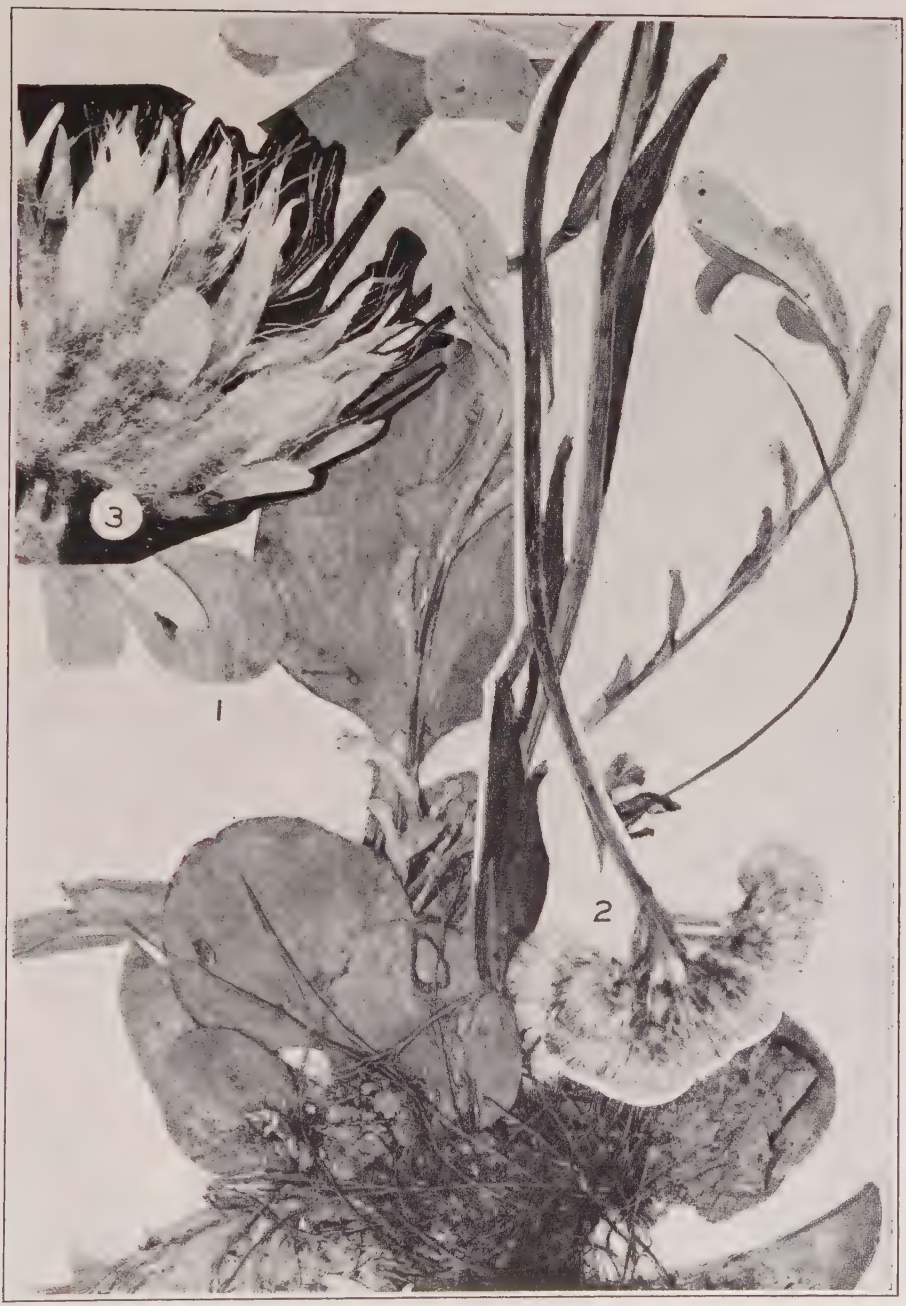

Photo. B. G. Schubert.

ANTENNARIA FALLAX, var. CALOPHYLLA: FIGS. 1 and 2, portions of base and summit of pistillate plant, × 1; FIG. 3, half of involucre, × 5.

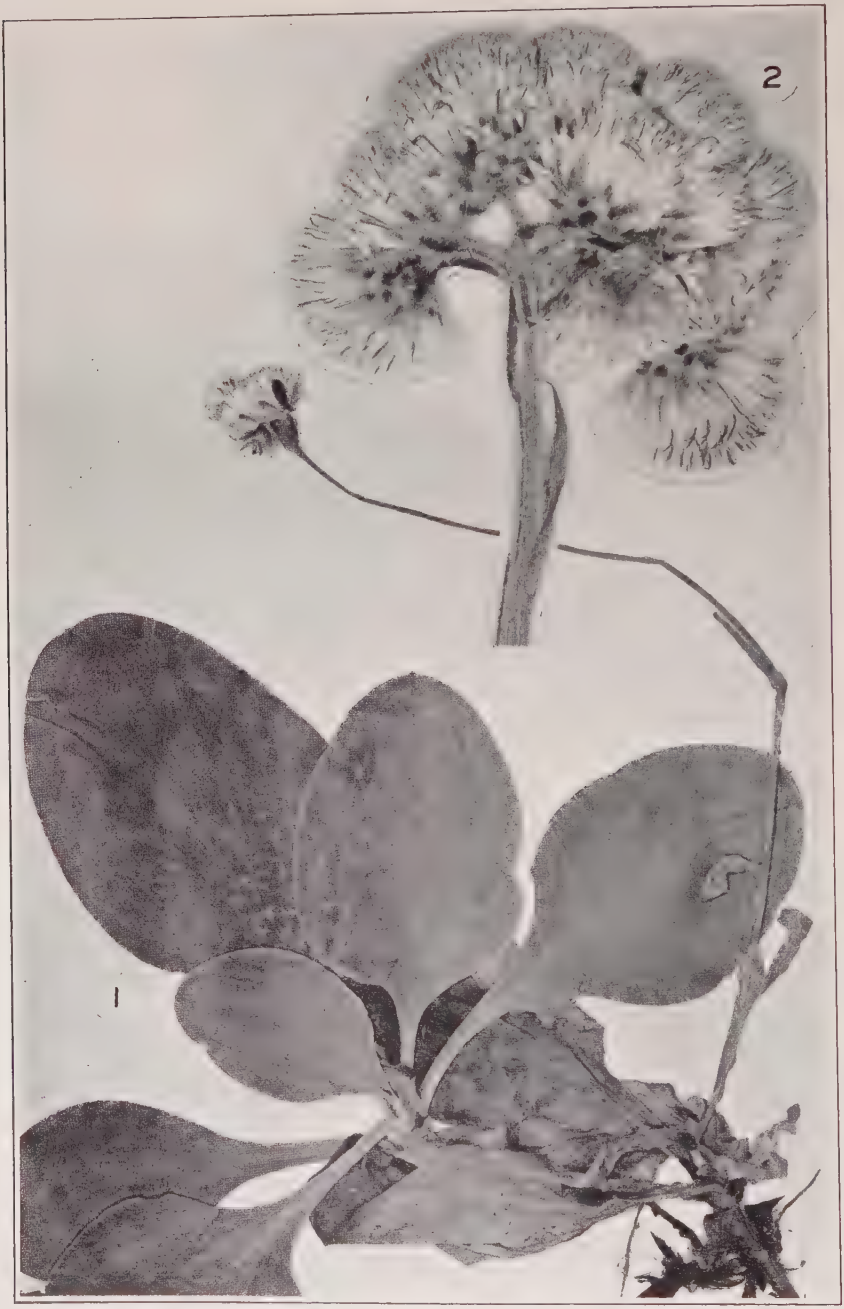

Photo. B. G. Schubert.

ANTENNARIA FALLAX, var. CALOPHYLLA: FIG. 1, staminate plant, × 1; FIG. 2, pistillate corymb, × 2.

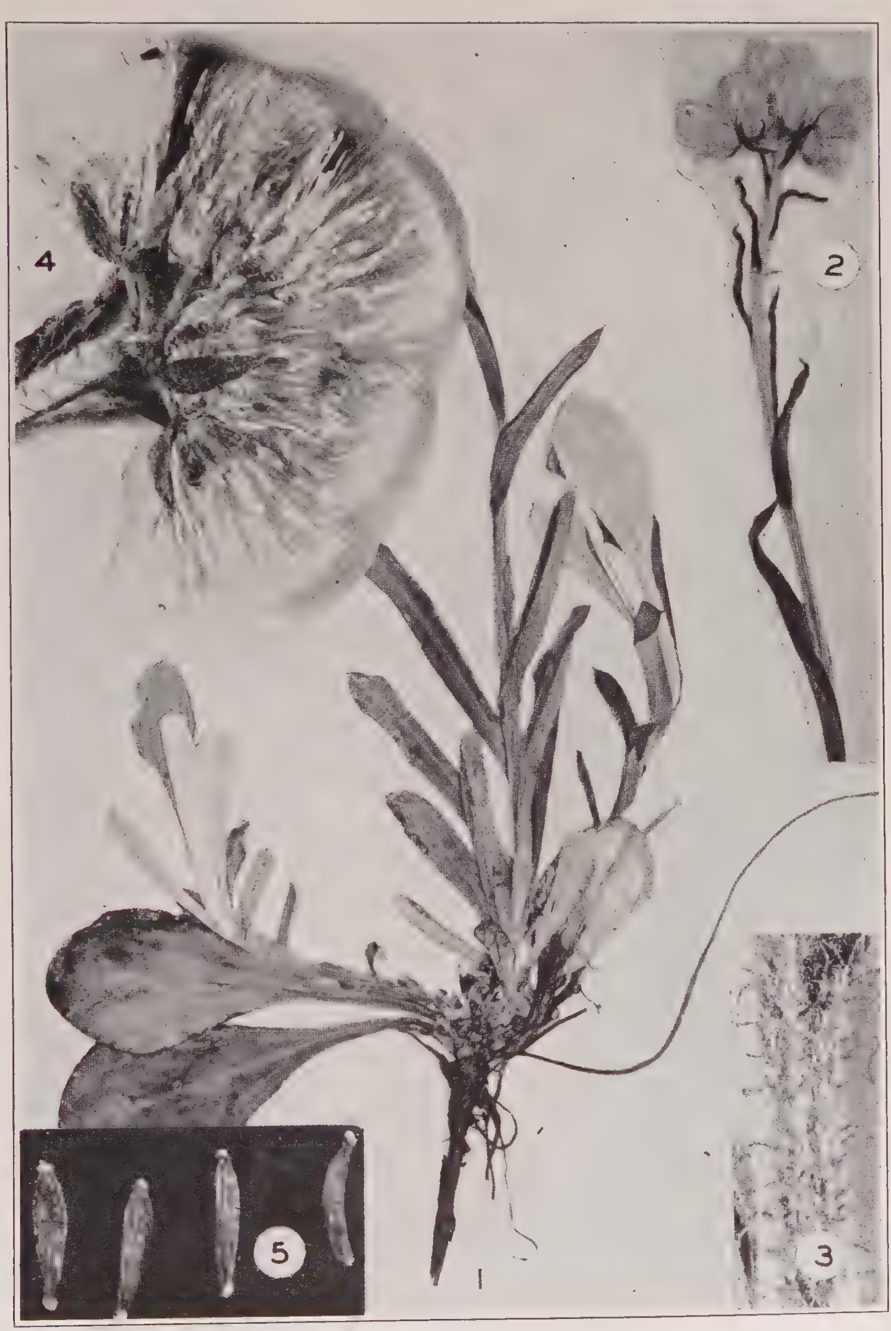

Photo. B. G. Schubert.

Antennaria Parlinii: figs. 1 and 2, base and summit of plant, × 1; fig. 3, summit of flowering stem, showing glands, × 10; fig. 4, corymb, × 2; fig. 5, achenes, × 10.

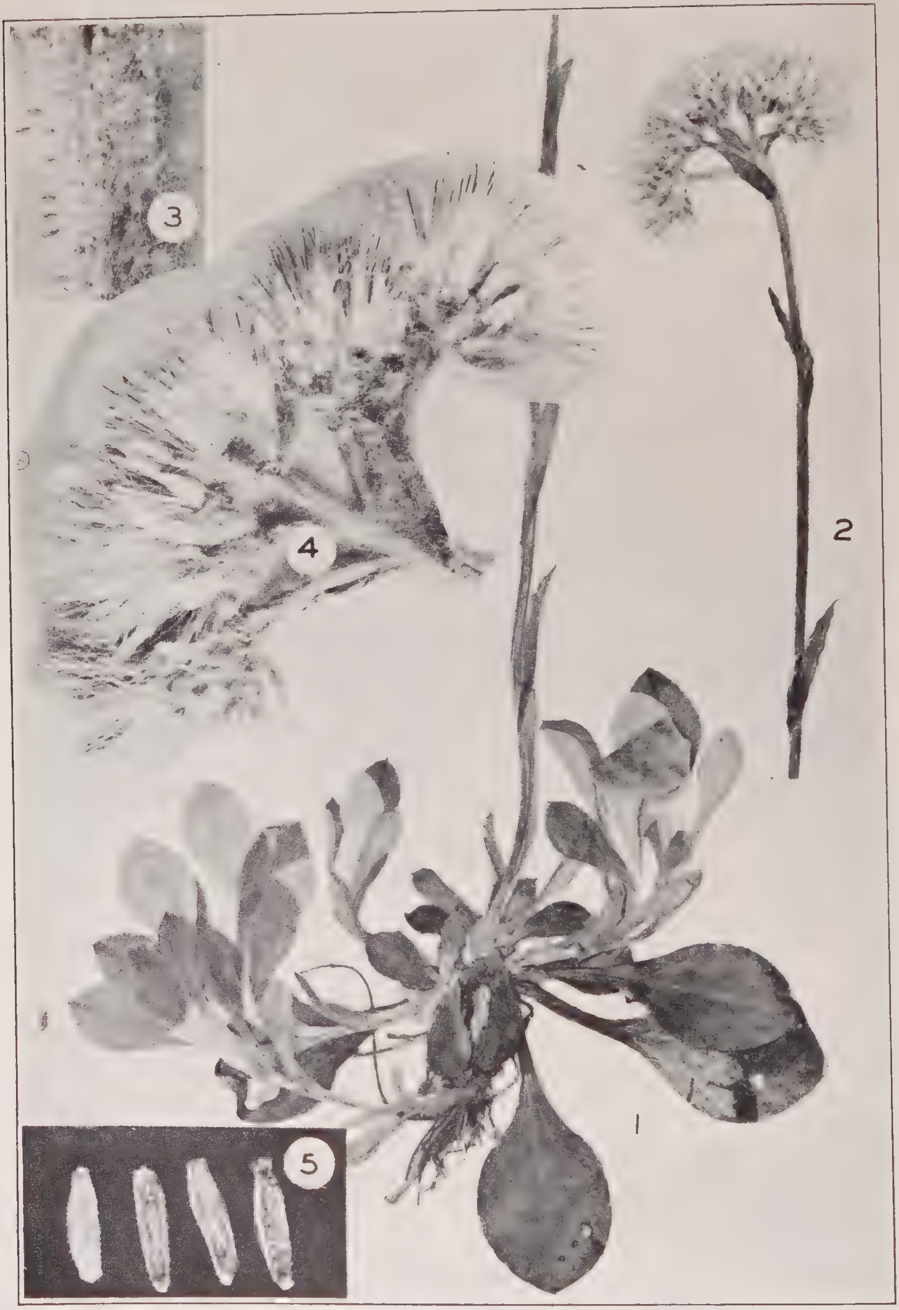

Photo. B. G. Schubert.

Antennaria Brainerdii: figs. 1 and 2, base and summit of plant, × 1; fig. 3, summit of stem, showing glands, × 10; fig. 4, corymb, × 2; fig. 5, achenes, × 10.

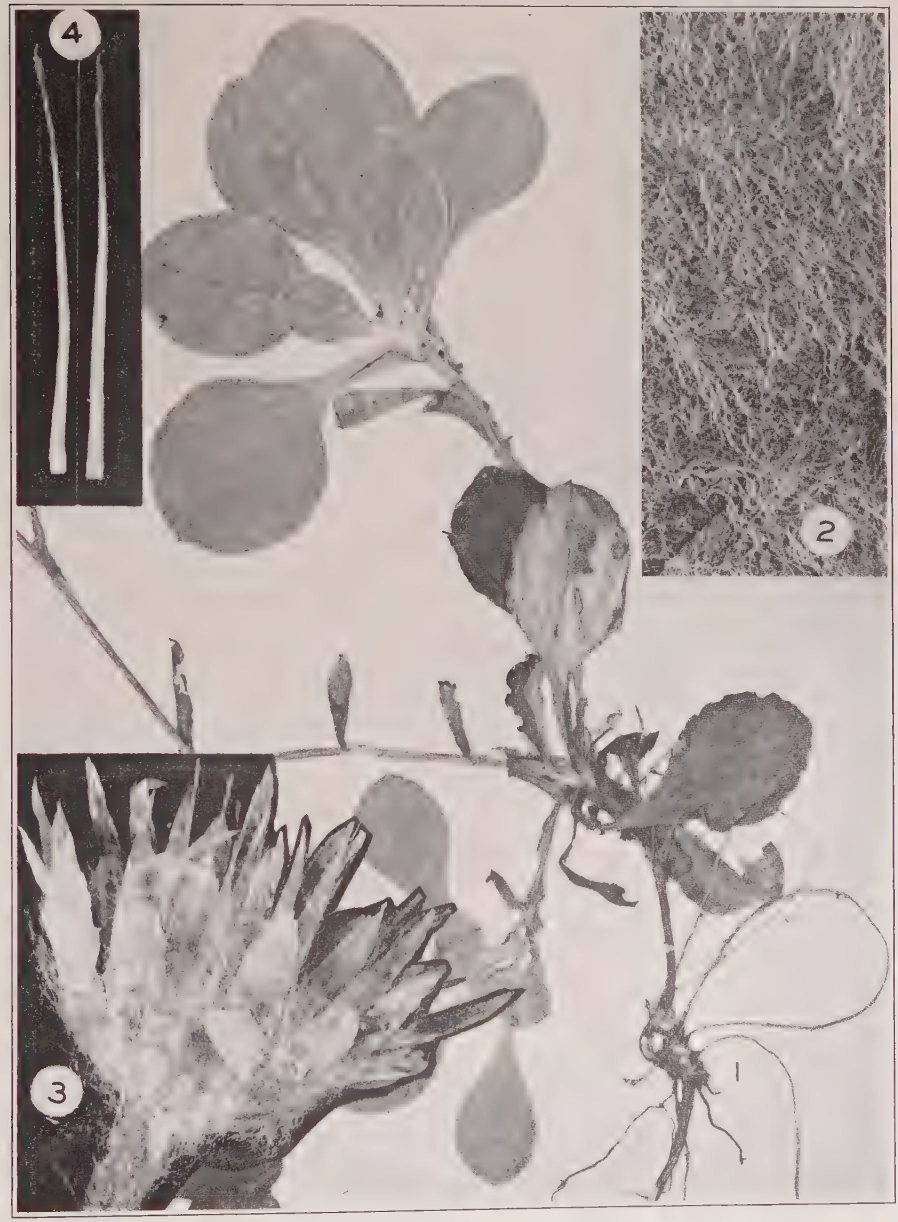

Photo. B. G. Schubert.

Antennaria Brainerdii: fig. 1, base of large-leaved extreme, × 1; fig. 2, upper surface of rosette-leaf, showing long tomentum, × 10; fig. 3, involucre, × 5; fig. 4, corollas, × 10.

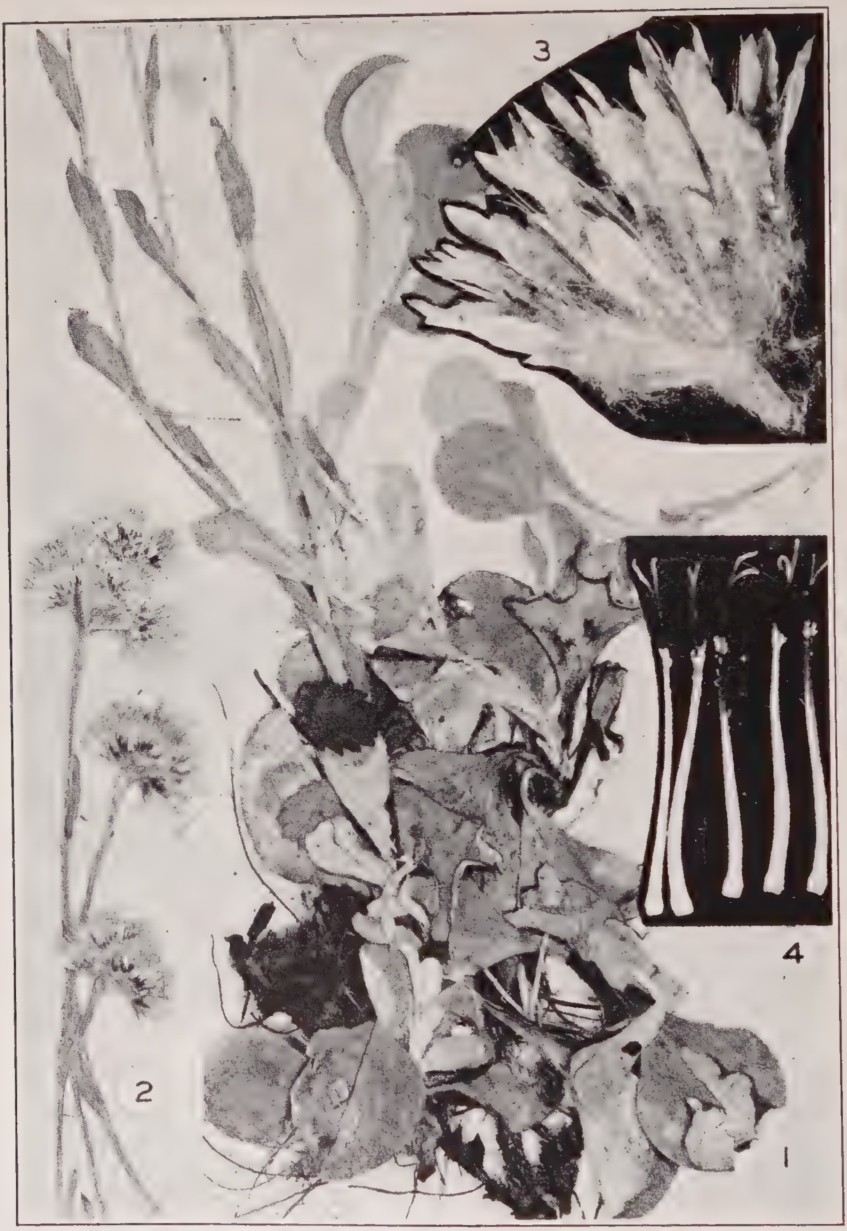

Photo. B. G. Schubert.

ANTENNARIA PLANTAGINIFOLIA: FIGS. 1 and 2, base and summit of pistillate plant, × 1; FIG. 3, involucre, × 5; FIG. 4, corollas, × 10.

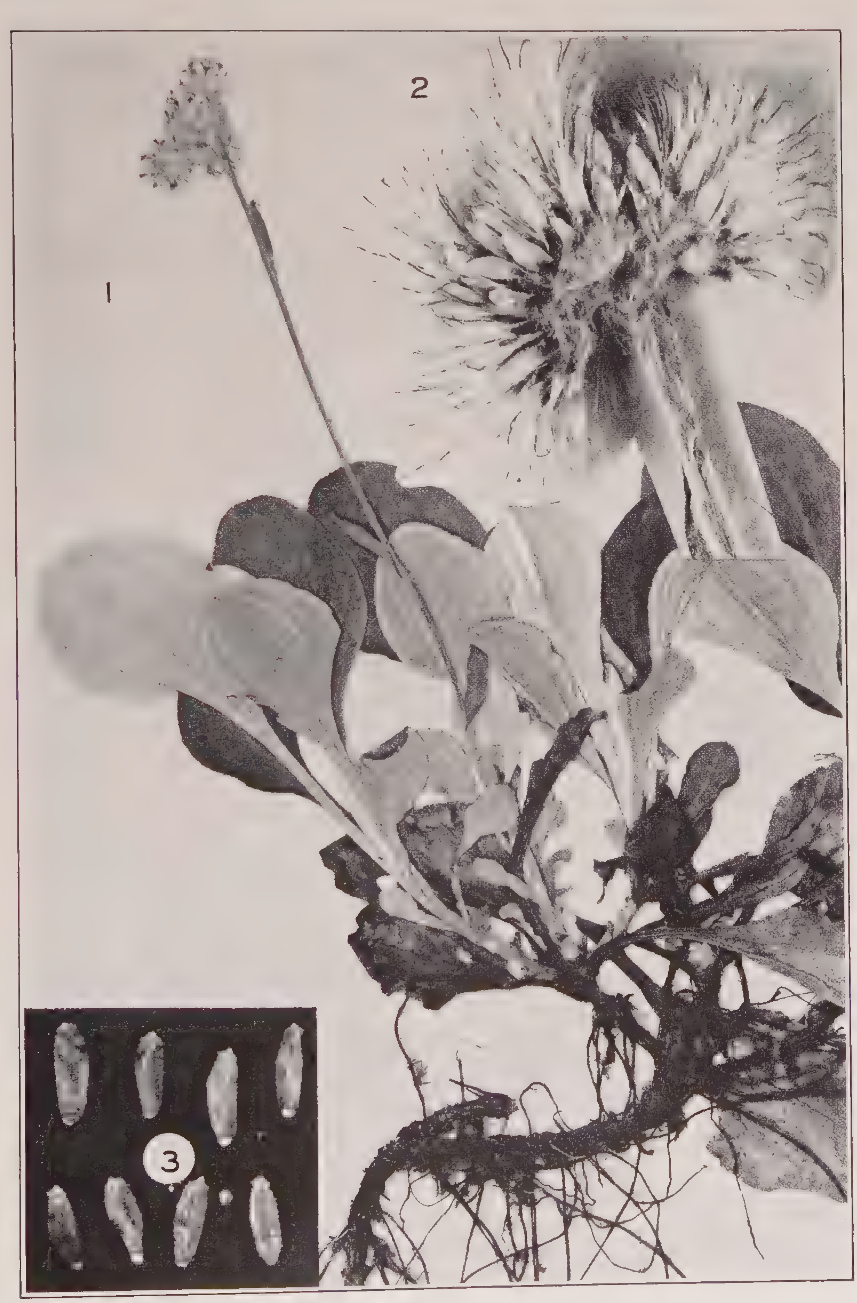

Photo. B. G. Schubert.

ANTENNARIA PLANTAGINIFOLIA: FIG. 1, staminate plant, × 1; FIG. 2, pistillate corymb, × 2; FIG. 3, achenes, × 10.

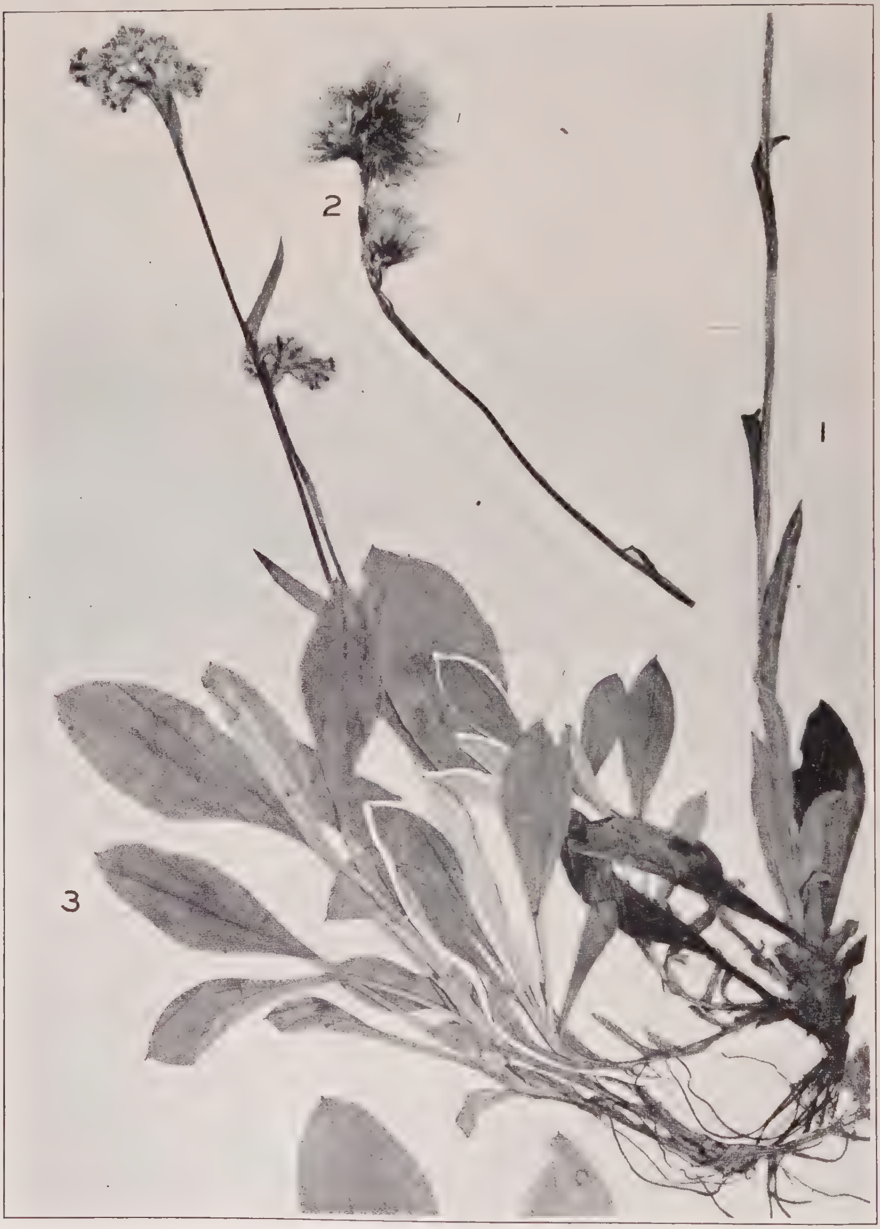

Photo. B. G. Schubert.

Antennaria plantaginifolia, var. petiolata: figs. 1 and 2, small fruiting plant, × 1; fig. 3, staminate plant, × 1.

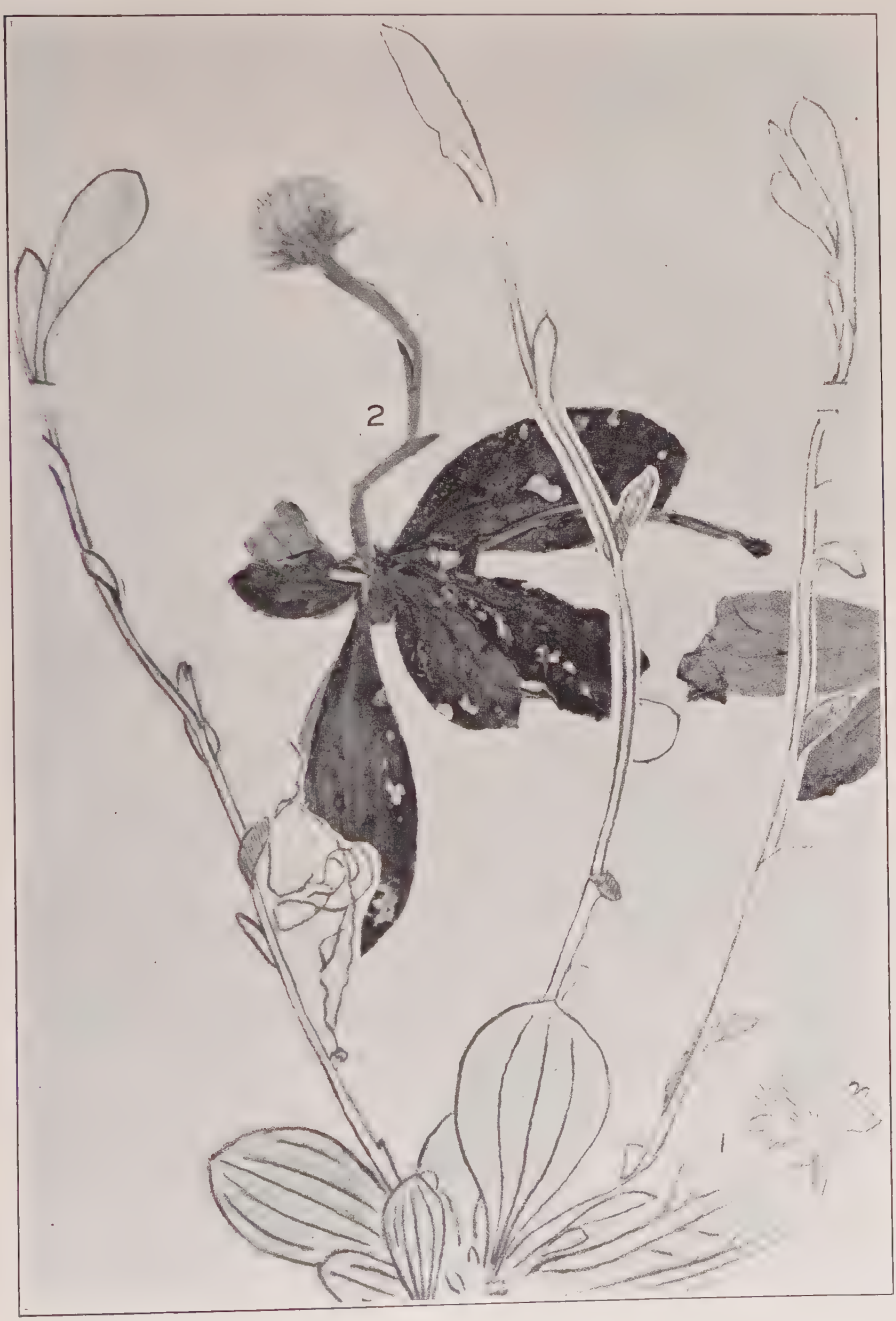

Photo. B. G. Schubert.

ANTENNARIA SOLITARIA: FIG. 1, tracing by *B. L. Robinson* of the Gronovian plant included by Linnaeus in his *Gnaphalium plantaginifolium;* FIG. 2, one of TYPE-specimens, × 1.

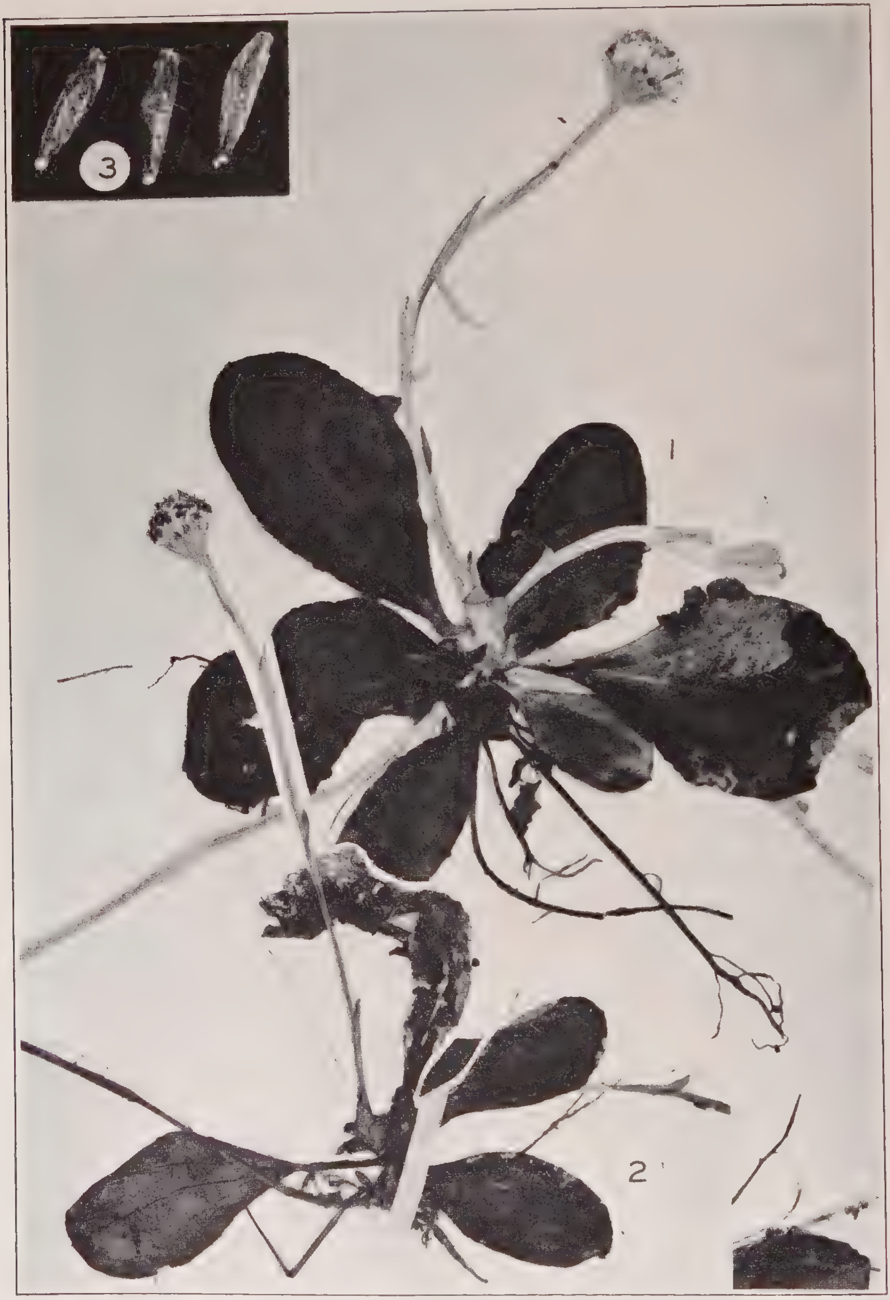

Photo. B. G. Schubert.

Antennaria solitaria: fig. 1, average staminate plant, × 1; fig. 2, small staminate plant, × 1; fig. 3, achenes, × 10.

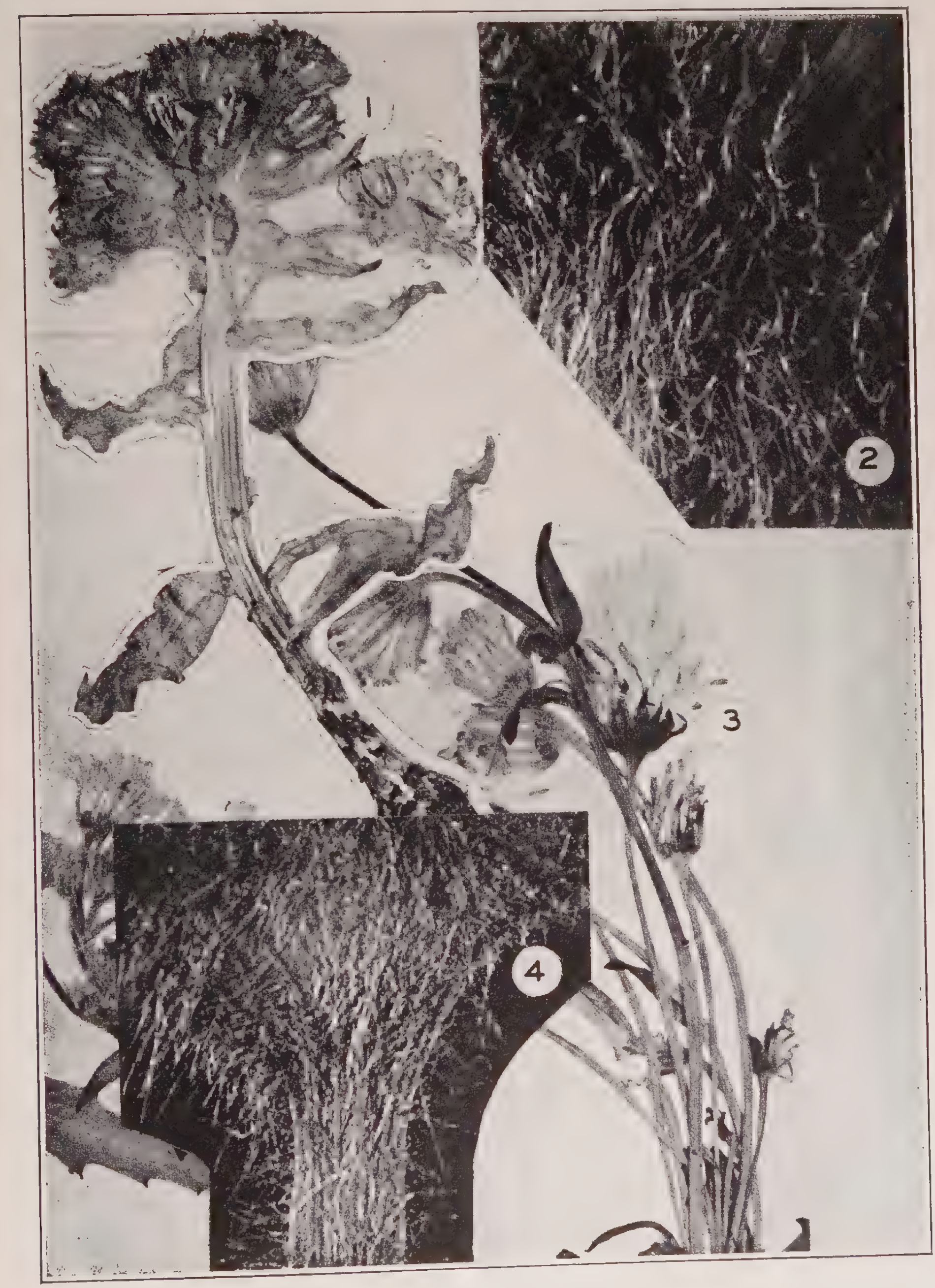

Photo. B. G. Schubert.

SENECIO CONGESTUS: FIG. 1, ISOTYPE, × 1; FIG. 2, summit of pedicel and base of involucre, × 10.

Var. PALUSTRIS: FIG. 3, inflorescence, × 1; FIG. 4, summit of pedicel and base of involucre, × 10.

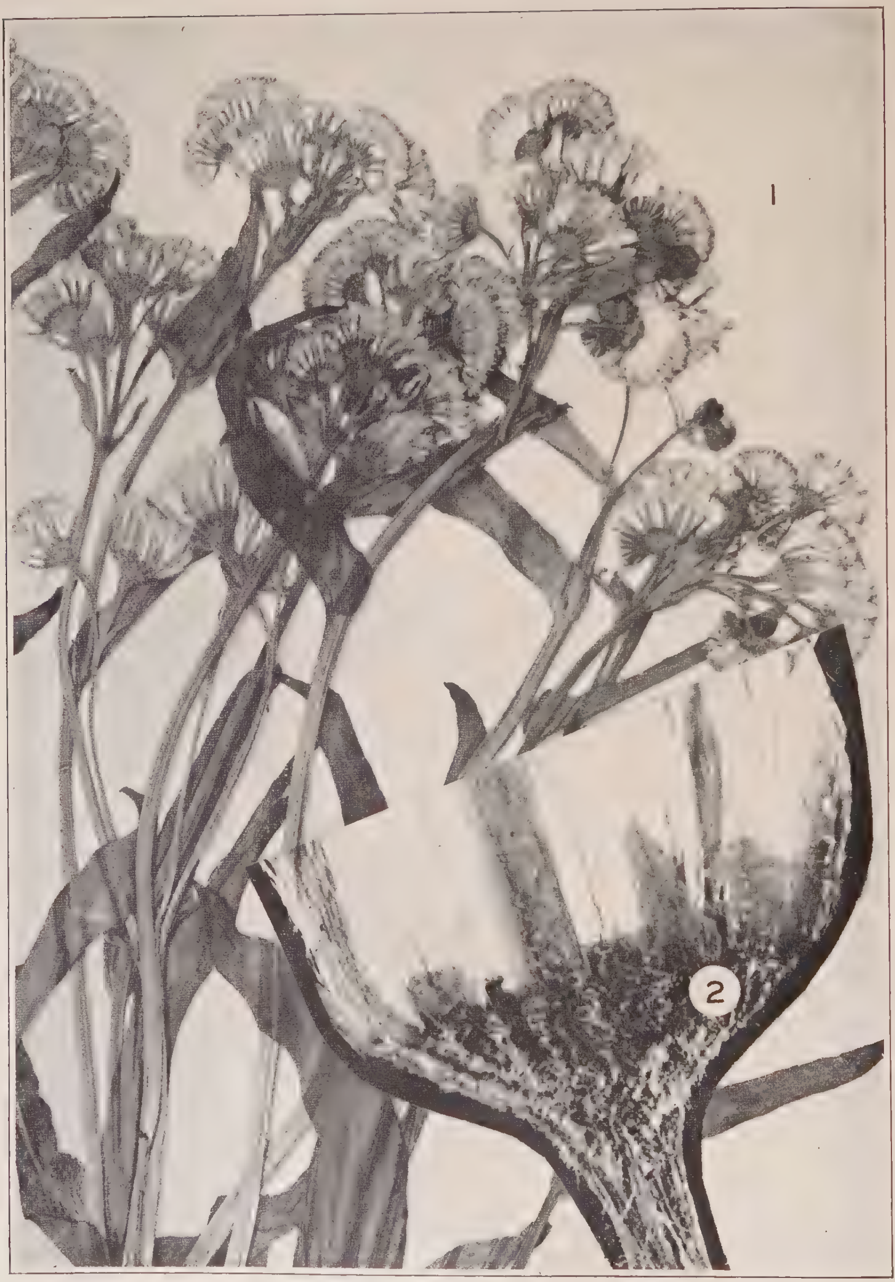

Photo. B. G. Schubert.

SENECIO CONGESTUS, var. TONSUS: FIG. 1, inflorescence of TYPE, × 1; FIG. 2, summit of pedicel and base of involucre, × 10.

forming cespitose clumps, others with the stems scattered and arising from the tips of elongate stolons, thus forming loose colonies. It is as if one united as a single species all the members of *Solidago* with the panicle made up of secund branches: calling *S. sempervirens* the maritime fleshy-leaved and, because of its habitat, the large-headed phase; *S. uniligulata* (*neglecta*) a thinner-leaved and, because of its occurrence in eastern acid peat, a smaller-headed phase; *S. missouriensis* a phase developed on the western prairies and, on account of its crowded habitat, sending up only one flowering stem at a time and spreading by prolonged subterranean stolons; and so on through many species. That would be easy and hopelessly superficial; it would be neither sound taxonomy nor phylogeny nor sensible ecology. That Hall, whose work up to the *Artemisia*-period had been sound and free from vagaries and who understood the taxonomic significance of growth-forms when associated with other characters, should suddenly have coöperated in such a confused and unclarifying piece of work is at least amazing.

In attempting to get some workable mean between this treatment and the extreme splitting of Rydberg and to put the many pigeon-holes of undigested material in the Gray Herbarium into such order that it could be readily available I have been handicapped by lack of field-experience with most of the species; but in this case I have temporarily adopted the sophistry of a student of one technical field who, venturing into another with which he was not too familiar, wrote: "It is conceivable that one who is, in a way, an amateur may be more likely to appreciate the more salient features . . . than the specialist".[1] At least the growth-habit, as shown by the few well collected specimens in the collections before[2] me, is highly suggestive of real specific differentiation.

A. VULGARIS L., the Eurasian species much naturalized in the northeastern States, Canada and Newfoundland, forms vase-like clumps arising from a thick but scarcely ligneous forking rhizome, only tardily sending out short stolons. It is tall, with glabrescent stems up to 2 m. high, and its large roundish-ovate to -obovate leaves are green and glabrous or promptly glabrate above, deeply cleft, and bearing at the base of the petiole 4 to 8 obvious leaflet- or stipule-like appendages. It occurs with us as three varieties. Typical *A. vulgaris* has the leaves cleft to midrib into lacerate or cut-toothed lance-acuminate divisions, this plant found from Newfoundland to Ontario, south to Nova Scotia, New England, New Jersey, Pennsylvania, casually to Georgia, Michigan and Wisconsin. Var. *glabra* Ledeb. is similar but with the narrowly lance-acuminate divisions of the primary leaves entire. It is local, from northwestern New England to Ontario, south to Connecticut, Ohio, Michigan and Kansas. Var. *latiloba* Ledeb. has thinner leaves, the principal ones less deeply cleft, the broadly obovate or rhombic terminal divisions and the oblanceolate to oblong lower ones and their few teeth blunt or merely acutish, the panicle but slightly developed. It is local in Quebec and New England. Only one other species of the few in the "Manual range" merged by Hall & Clements with the Old World *A. vulgaris* has stipule-like appendages. This is

---

[1] Campbell, Douglas Houghton, Outline of Plant Geography, v (1926).

[2] Ninety per cent of so-called specimens in this group are not specimens at all; they are lazily plucked bits, their collectors taking no pains to get the subterranean parts or to show the habit or the lower leaves. That would require work and acuteness.

A. SERRATA Nutt., indigenous on bottoms, on prairies or in rich thickets from Wisconsin to North Dakota, south to Illinois, Missouri and Kansas. Hall & Clements treat it as a subspecies of *A. vulgaris*, but its uncleft lance-attenuate sharply fine-serrate primary leaves are only 1–3 cm. broad, their basal appendages small and lance-subulate. I have not seen a base but it is evidently near the next species in which the base has been well collected.

A. HERRIOTII Rydb., found on plains, dry ridges and gravelly shores from Minnesota to northern Alberta and South Dakota. Rhizome stout, woody, without evident stolons; leaves linear-attenuate, without basal appendages, entire or with few falcate lobes, the larger ones 1–2 dm. long (twice or thrice length of leaves of *A. vulgaris*) and only 0.5–1.5 cm. wide (many times narrower than in *A. vulgaris*). Hall & Clements get rid of this characteristic species of the northern Plains (east of the Rocky Mts.) by pushing it into the "the *douglasiana* form" of their *A. vulgaris*, subsp. *heterophylla*, i. e. *A. Douglasiana* Besser, a big species of the Pacific slope, from southern British Columbia to Lower California, with the rhizome or its branches long and creeping, suggesting thick rope, the "principal leaves oblanceolate or broadly elliptic in outline, somewhat spatulate, . . . 1.5–

5 or 10 cm. wide . . . all . . . tomentulose . . . above" (H. & C.). Naturally, to those who place *A. serrata* and *A. Douglasiana* in the Old World *A. vulgaris*, the Great Plain species, *A. Herriotii*, with strong woody base, narrowly long-attenuate leaves glabrous above, and elongate (instead of campanulate) involucre 4–5 (instead of 3–4) mm. long, could make no appeal. But it looks like a real species and its base is similar to that of

A. LONGIFOLIA Nutt., occurring on dry plains or in alkaline situations from western Ontario and Michigan to the Rocky Mts., a plant with hard woody bases (without stolons) branching into crowns up to 2 cm. thick, the many stems clustered, the very narrow linear-attenuate entire leaves gray-puberulent above, with revolute margins, the principal ones 3–10 cm. long and mostly 2–5 mm. broad, etc.

When we come to *Artemisia ludoviciana* Nutt. the situation seems to be different. This is an aggressive and "weedy" species "varying all over the lot", all over the lot because it is loosely stoloniferous, the long and lash-like stolons enabling it to form loose colonies with more or less circular outline. It is this highly inconstant series which has spread eastward along railroads, roadsides and in litter to Quebec, the Maritime Provinces and the Atlantic States. The growth-habit of its base is very definite; its foliage, whether entire, falcately cleft or merely toothed, hopelessly indefinite. Yet Hall & Clements toss them all into their all-inclusive *A. vulgaris*, not as one subspecies but as three: two of them, their *A. vulgaris*, subspp. *ludoviciana* and *gnaphalodes*, which differ only in that the former has the wool of the upper leaf-surface less permanent than in the latter, each being considered by them as equivalent in value (as subspecies) to true nonstoloniferous Eurasian *A. vulgaris*, the big *A. Douglasiana* of the Pacific Slope, the woody-based and nonstoloniferous more eastern campestrian *A. longifolia*, the campestrian *A. serrata*, and others quite as definite. The attempt, however, in view of the very real character of the rhizome and stolons, to keep *A. gnaphalodes* more than weakly varietally apart from typical *A. ludoviciana* has thus far proved hopeless. In fact, these two are really somewhat intermediate variations in a series which includes plants with upper leaf-surfaces lanate or others, with distinctive ranges, with them bright green and glabrous from the first. In the limited area of Gray's Manual I am recognizing the following, all as varieties of *A. ludoviciana* which stands apart from *A. serrata*, *Herriotii* and *longifolia* in its loosely colonial habit, the slender cord-like rhizome freely stoloniferous, the stolons slender and elongate, the primary leaves either entire or variously lobed or cleft. Since the abundance as weeds in the East varies, I shall be glad of information regarding additional areas invaded by them.

a. Young leaves tomentose or lanate on upper as well as lower surface....*b.*
  b. Pubescence of upper surfaces of primary and often rameal leaves loosening and rather deciduous, the older leaves becoming glabrate and bright green above; leaves entire or some of the lower and median ones with falcate-lobed margins..................................*A. ludoviciana* (typical).
  b. Pubescence of upper as well as lower surfaces persistent, the upper surface remaining whitish or gray....*c.*
    c. Principal leaves lance-linear, lanceolate, oblong or oblanceolate, entire or with marginal falcate teeth or divisions, the blades soft and pliable, heavily tomentose, many times longer than broad....*d.*
      d. Leaves flat, mostly straight, ascending or spreading.
        Blades lanceolate, acute or attenuate, longer ones 5–10 cm. long, ascending; stem usually simple below or to summit, without or more often with short suppressed axillary branches..........Var. *gnaphalodes*.
        Blades oblong, oblong-elliptic or oblong-oblanceolate, blunt or merely acutish, 2.5–7 cm. long, loosely ascending or spreading; stems frequently with loosely spreading or divergent elongate branches....................................Var. *latifolia*.
      d. Leaves mostly plicate, widely spreading or recurving, often twisted, the longer ones 2.5–5 cm. long; stem or its erect basal branches with suppressed axillary branchlets....................................Var. *pabularis*.
    c. Principal leaves broadly oblong, with few coarse teeth around the summit, firm and thick, rather hard, only two to four times as long as broad; axillary branches short and suppressed..............................Var. *Brittonii*.
a. Young leaves glabrous (or only obscurely puberulent) and bright green above from the first, blades linear to lanceolate, entire or with long falcate lobes, they and the lobes attenuate.
  Panicle open and leafy, virgate or with virgate branches; involucre globose-hemispherical; stem usually covered with dense continuous felt..........................Var. *americana*
  Panicle dense, pyramidal; involucre cylindric or cylindric-ovoid; stem thinly tomentulose to puberulent, often glabrescent......................................Var. *mexicana*.

A. LUDOVICIANA, typical (*A. vulgaris*, subsp. *ludoviciana* (Nutt.) Hall & Clements, in part).—Native of prairies and dry open soils or thin woodland, Michigan to Washington, south to Illinois, Arkansas, Texas and Mexico; spread eastward along railroads, roads, in waste ground, dooryards, grassland, cemeteries, etc., to New England, New York, New Jersey and Virginia.

Var. GNAPHALODES (Nutt.) T. & G. (*A. gnaphalodes* Nutt.; *A. vulgaris*, subsp. *gnaphalodes* (Nutt.) Hall & Clements, in part).—Native of prairies, etc., southern Ontario and Michigan to southern British Columbia, south as in the preceding; naturalized eastward to Quebec, New England, New Jersey and Delaware.

Var. LATIFOLIA (Bess.) T. & G. (*A. Purshiana* Bess., var. *latifolia* Bess.; *A. vulgaris*, subsp. *gnaphalodes*, in part, of Hall & Clements).—Native from Manitoba and Minnesota to southern British Columbia, south to Iowa, Kansas and New Mexico; naturalized eastward to Quebec, New Brunswick and New England.—One of the more marked extremes of the species on account of its short and broad leaves, tendency to divergent branching and relatively loose tomentum. The following are characteristic: QUEBEC: Lac des Chênes, *Rolland*, no. 6121; Notre-Dame-de-la-Dore, Co. Lac-St.-Jean, *Victorin et al.*, no. 30,517; L'Annonciation, Co. Labelle, *Victorin et al.*, no. 384. NEW BRUNSWICK: Fairville, *Fernald*, no. 2268. MAINE: Portland, July 19, 1910, *A. R. Stubbs;* North Berwick, Sept. 1895, *Parlin.* NEW HAMPSHIRE: south of Cold River Station, Walpole, July, 1901, *Blanchard.* MASSACHUSETTS: Newbury, Aug. 7, 1899, *Williams;* Lee, Sept. 3, 1920, *Hoffmann.* MICHIGAN: Keweenaw Co., *Farwell*, no. 427. INDIANA: Kokom~~a~~, Aug. 28, c/ 1942, *C. M. Ek.* ILLINOIS: Chicago, *Lansing*, no. 2635. MANITOBA: Cedar Lake, Riding Mountain National Park, *Scamman*, no. 2967. MINNESOTA: Lake Vadnais, *Rosendahl*, no. 5180. IOWA: Estherville, *Wolden*, no. 1264. NORTH DAKOTA: Leeds, Aug. 14, 1900, *Lunell;* Jamestown, *O. A. Stevens*, no. 302. SOUTH DAKOTA: Redfield, *Brenckle*, no. 40-74. KANSAS: Ellis, July 21, 1935, *Bondy.* SASKATCHEWAN: ex Hook. (ISOTYPE). ALBERTA: Rosedale, *Moodie*, no. 1183. MONTANA: Silver Bow, *H. M. Hall*, no. 11,492, in part. WYOMING: Upper Tongue R., Bighorn Mts., July 22, 1900, *J. G. Jack.* NEVADA: Truckee Valley, *W. W. Bailey*, no. 640. BRITISH COLUMBIA: Beavermouth, *C. H. Shaw*, no. 1153.

Var. PABULARIS (Nelson) Fernald, supra. Native from Manitoba and Minnesota to Oregon, south to Iowa, Nebraska and Colorado; adventive eastward to Michigan.—One of the most characteristic varieties on account of its longitudinally folded and recurving or arching leaves. The following are characteristic. MICHIGAN: River Rouge, *Farwell*, no. 4375, in part. MINNESOTA: Brown's Valley, Sept., 1893, *Sheldon;* Muskoda, *Ballard*, no. 3120. IOWA: Iowa Falls, Aug. 1928, *M. E. Peck;* Estherville, *Wolden*, no. 1264a. NORTH DAKOTA: Leeds, Aug. 20, 1900, *Lunell*, as *A. longifolia;* Fargo, Aug. 19, 1901, *Waldron & Manns.* SOUTH DAKOTA: Brookings, Sept. 1894, *Thornber;* Iroquois, Aug. 11, 1894, *Thornber.* NEBRASKA: Kennedy, Oct. 15, 1900, *Bates;* Hazel Creek, *Fred Clements*, no. 2917; Thedford, *Rydberg*, no. 1725. WYOMING: Creston, *Nelson*, no. 4426 (ISOTYPE). COLORADO: Palmer Lake, Sept. 3, 1919, *H. M. Hall.* OREGON: Upper Klamath Lake, *M. E. Peck*, no. 9523.

Although Hall & Clements call var. *pabularis* merely "A slender competition-form of *A. vulgaris gnaphalodes*" with "Leaves only 2 to 5 mm. wide", it seems to have won its competition and to grow successfully over a vast area.

Var. BRITTONII (Rydb.) Fern., supra. A local extreme of Montana to Colorado, etc., casually adventive in MAINE: about wool-waste, Sept. 10, 1895, *Parlin.*

Var. AMERICANA (Bess.) Fern., supra. Native from Alberta to Texas and northern Mexico; casually adventive in Massachusetts. The following, often confused with var. *mexicana*, are characteristic. MASSACHUSETTS: dry sandy field, not scarce, Clam Shell Bluff, Concord, Aug. 11, 1938, *R. J. Eaton.* TENNESSEE: Nashville, *Gattinger.* KANSAS: Poola, *Oyster.* TEXAS: *Lindheimer*, fasc. iii. no. 442; Weathersford, *Tracy*, no. 8135; Graham, *Reverchon*, no. 3283; Tarrant Co., *Ruth*, no. 320; Briscoe, *Cory*, no. 17,314; Boat Springs, Chisos Mts., *Cory*, no. 7258. BRITISH NORTH AMERICA: *Richardson.* ALBERTA: below McKay, Lower Athabasca River, *Raup*, no. 6001. IDAHO: Twilight Gulch, *Macbride*, no. 485, as *A. atomifera* Piper. COLORADO: Engelmann Cañon, *Clements & Clements*, no. 57; Norwood Hills, *E. P. Walker*, no. 455; Naturita, *Payson*, no. 590. NEW MEXICO: Cloudcroft, *E. D. Schulz*, no. 308. ARIZONA: Marshall Gulch, *Shreve*, no. 5398; Mule Mts., *Harrison & Kearney*, no. 6238.

Besser's original description of *Artemisia vulgaris*, var. *americana* (as *americanum*) was based primarily on a "specimen Hookerianum e Britt. N. America", the plant with laciniate leaves "supra glabris", ½ inch [1 cm.] wide, with lanceolate laciniae 1½–3 lines wide, the virgate panicle with hemispherical heads. It seems to be the plant here called *A. ludoviciana*, var. *americana*, although Hall & Clements place it in the very striking *A. Tilesii* Ledeb. (their *A. vulgaris*, subsp. *Tilesii*), a plant of eastern Siberia and Pacific America from Alaska to Oregon, etc., with "principal leaves ovate or broadly elliptic in outline, . . . 3–7 cm. wide", etc. I have seen no authentic material and my interpretation may be incorrect; but the general placing of these specimens in var. *mexicana*, simply because the leaves are bright green above and often slenderly dissected, overlooks the important characters of the latter, the densely pyramidal panicle of cylindric-ovoid heads or, as Willdenow's original diagnosis said, "panicula pyramidali subfoliata, floribus ovatis subsessilibus bracteis tomentosis", such a plant as abounds in much of Mexico.

Var. MEXICANA (Willd.) Fern., supra. Mexico and Texas, extending northeastward to barrens and sands of Missouri. The following are typical. MISSOURI: Dodson, *Bush*, no. 7844; Courtney, *Bush*, no. 6509. ARKANSAS: *Engelmann*, ISOTYPE of the 2d plant described by Besser as *A. vulgaris*, var. *americana*. TEXAS: *Lindheimer*, fasc. iii. nos. 442, 443, and 444; Polytechnic, *Ruth*, no. 320; Brown Co., *Cory*, no. 15,855. MEXICO: *Berlandier*, no. 1253; *Bourgeau*, no. 832; *Ghiesbrecht*, no. 155; *Hinton*, no. 1847; *Lyonnet*, no. 435; *Palmer*, nos. 597, 600 and 602; *Parry & Palmer*, nos. 530 and 531; *Pringle*, nos. 290, 7929, 8765, 9848 and 11,481; *Schaffner*, no. 277.

One other species which has spread into the Northeast is the very characteristic *Artemisia Carruthii* Wood (*A. kansana* Britton; included under their *A. vulgaris*, subsp. *Wrightii* (Gray) Hall & Clements), with the somewhat ligneous crown producing abundant prolonged and often leafy-tipped stolons (in some specimens these freely forking and 3 dm. long), the short (1–5 cm. long) elliptic to oblanceolate leaves essentially all pinnately dissected to the midrib into narrowly linear or linear-filiform lobes only 3–10 mm. long and 0.1–1 mm. broad. Native on plains and in dry scrub from western Kansas and Colorado to western Texas, New Mexico and Arizona, this aggressive and vegetatively rapidly reproducing plant has come east. The following eastern specimens are before me. RHODE ISLAND: Pawtucket, October, 1898, *M. L. McCudden*. INDIANA: Miller's, October, 1898, *Umbach*. MISSOURI: Sheffield, *Bush*, nos. 1838 and 3333.

Allied to these and likely to wander eastward (especially since it is here cultivated as SILVER-KING ARTEMISIA) is the characteristic *Artemisia albula* Wooton, of western Texas, New Mexico, Arizona, southern California and northern Mexico. Although this small-leaved and small-headed white or whitish plant was given no recognition by Hall & Clements, except as a reduced "form" of their too inclusive *A. vulgaris*, subsp. *gnaphalodes*, they did see something in it: "but with distinctive habit, very narrow leaves, widely branched inflorescence, and exceptionally small heads, the involucres 3 mm. high". The "distinctive habit" was unexplained, but *A. albula* forms dense or cespitose clumps and, instead of spreading as do *A. ludoviciana* and its many varieties (including *gnaphalodes*) by slender elongate stolons, its basal offshoots, as shown by material from careful collectors like Charles Wright, are assurgent or erect from the subligneous crown and with well developed leaves. This is a "distinctive habit" similar to that of the woody-based *A. Michauxiana* Bess. (*A. discolor*). That it was not noted by Hall & Clements is natural. Of the 54 sheets of it in the Gray Herbarium 38 indicate no attempt to collect the characteristic base, most of them nipped-off bits without even the distinctive leaves of the main stem—the kind of rubbish which some think we must house in our limited space because, forsooth, these snips have numbers!; in such disgraceful witnesses to laziness the diagnostic characters are mostly lacking. These points were strongly emphasized by Dr. Merrill in his foreword to Johnston's most helpful and practical "The Preparation of Botanical Specimens for the Herbarium"[1], a pamphlet which should be carefully studied by all who attempt to make herbarium-specimens.

III. SENECIO CONGESTUS

(Plates 959 and 960)

Senecio congestus (R. Br.) DC., var. **palustris** (L.), stat. nov. *Cineraria palustris* L. Sp. Pl. ed. 2, 1243 (1763). *S. palustris* (L.) Hook. Fl. Bor.-Am. i. 324 (1834), not Velloso (1827). *S. tubicaulis* Mansfeld in Fedde, Rep. Spec. Nov. xlviii. 264 (1940). Plate 959, figs. 3 and 4.

S. congestus, var. **laceratus** (Ledeb.), comb. nov. *S. palustris*, γ. *laceratus* Ledeb. Fl. Ross. ii. 648 (1845), excl. syn.

S. congestus, var. **tonsus,** var. nov. (tab. 960), habitu a var. *palustre* differt corymbo aperto vix lanato-villoso, pedicellis hirtellis sparse villosisque.—Alberta to Wisconsin and Minnesota. The following are characteristic. Alberta: Gov. Hay Camp district, Slave River, about 59° 31′ N., 111° 28′ W., Aug. 4, 1928, *Raup*, no. 3384; Reed's Portage, upper Embarras River, about 58° 28′ N., 111° 32′ W., Aug. 15, 1930, *Raup*, no. 3383. Manitoba: Clear Lake, alt. 2016 ft., Riding Mountain National Park, Aug. 29–Sept. 2, 1941, *Scamman*, no. 2970. Wisconsin: La Chapelle, July 16, 1897, *L. S. Cheney*, no. 7419 (type in Herb.

---

[1] Johnston, I. M., The Preparation of Botanical Specimens for the Herbarium. Published by the Arnold Arboretum of Harvard University. 1939.

Gray.). MINNESOTA: sandy lake-shore, Detroit, June 20, 1909, *H. F. Bergman.*

Unfortunately the name *Senecio palustris* (L.) Hook. (1834) is a later homonym, excluded by *S. palustris* Velloso (1827). When Mansfeld published for it the new binomial *S. tubicaulis* in 1940 he evidently overlooked *S. congestus* (R. Br.) DC. Prodr. vi. 363 (1837), which rests upon *Cineraria congesta* R. Br. in Parry, 1st Voyage, App. 279 (1824), the arctic extreme with the densely congested corymb and the leaves heavily villous-lanate, the plant treated as *S. palustris*, var. *congestus* (R. Br.) Hook. by Hooker, l. c., by Ledebour, l. c., and which in the Synoptical Flora, 1^2. 394 (1884) Gray placed under *S. palustris* (L.) Hook., with the comment: "*C*[*ineraria*] *congesta*, R. Br. in Parry, Voy., Richards., & c., only an arctic and woolly condensed form, var. *congesta,* Hook.".

Typical arctic *Senecio congestus* (PLATE 959, FIGS. 1 and 2, from ISOTYPE) extends south at least to the southeastern coast of Labrador, but more generally across North America it is represented by var. *palustris* (PLATE 959, FIGS 3–4), which I cannot separate from the wide-ranging plant of Eurasia with an open corymb but with copious long villosity or wool on the expanding corymb and more or less permanent dense villi on the pedicels and involucre. This variety extends south with us to the Côte Nord, Quebec, the foot of James Bay, and northern Iowa.

Var. *laceratus*, described from western Alaska, is an extreme with all the leaves lacerate-pinnatifid.

Var. *tonsus* (sheared) has almost or quite lost the long and dense villous-tomentum. Its open corymb has merely hirtellous or short-pilose pedicels or the long villi very few and scattered (PLATE 960).[1]

In PLATE 959, FIG. 1 is an ISOTYPE, × 1, of SENECIO CONGESTUS; FIG. 2, summit of pedicel and base of involucre, × 10, of ISOTYPE. FIGS. 3 and 4, var. PALUSTRIS: FIG. 3, inflorescence, × 1, from Vartofte-Asaka, Sweden, Aug., 1907, *Karl Wigardt;* FIG. 4, summit of pedicel and base of involucre, × 10, from same plant.

PLATE 960. S. CONGESTUS, var. TONSUS: FIG. 1, inflorescence of TYPE, × 1; FIG. 2, summit of pedicel and base of involucre, × 10, from TYPE.

(*To be continued*)

---

[1] A discoid form of the boreal *Senecio Pseudo-Arnica* Less. is S. PSEUDO-ARNICA Less., forma **Rollandii** (Victorin), stat. nov. *S. Pseudo-Arnica*, var. *Rollandii* Victorin, Mém. Soc. Roy. Canada, sér. 3, xix. 87, t. 4 (1925). *S. Rollandii* (Victorin) Victorin, Contrib. Lab. Bot. Univ. Montréal, no. 13: 26 (1929).

FILAGO ARVENSIS IN NORTH AMERICA.—Specimens of *Filago arvensis* L. collected on July 31, 1942, by Mary Johnstone at Kitchener, British Columbia, close to the southeastern boundary of the Province, apparently provide the first record of this species for the continent. The collection-note states "growing on roadsides and appears to be spreading all over the district".

In response to a request for further material Mr. W. B. Johnstone of Cranbrook collected an excellent series of specimens at the same station in 1943. In August of the same year Mr. J. W. Eastham found it "in a barnyard" at Erickson, some ten miles south of Kitchener. This would indicate that it is established over a considerable terrain and may well spread over a much larger area or until it reaches the limits of adaptability.

This plant has a superficial resemblance to species of *Gnaphalium*. It is by no means inconspicuous, as it attains a height of from 2 to 4 decimetres. It is not known to have any economic significance. The species is a native of Eurasia where it grows in dry sandy or stony soils. I am indebted to Dr. M. L. Fernald of the Gray Herbarium, Harvard University, for his kindness in verifying the determination.—GEORGE A. HARDY, Provincial Museum, Victoria, B. C.,

INJURY TO HERBARIUM-SPECIMENS BY EXTREME HEAT.—Ever since the use of corrugated pasteboard in drying specimens has come into vogue there has been a tendency to try very rapid drying by placing the presses of "ventilated" specimens over heat. The belief has been propagated that this method tends to keep the natural colors—when it does not steam and blacken specimens not sufficiently dried before being subjected to heat. The late Dr. M. O. Malte made wonderfully fine specimens on his trips to Labrador and the Hudson Bay area by placing the presses, on shipboard, over the grills from the engine-room. Mr. Long and I similarly used the heat from the engine-room on Newfoundland steamers—thus providing diversion and subjects for inquiry for the other passengers. In our case, however, great care was taken to give the specimens a full twenty-four hour period between driers ("blotters"), then to straighten foliage, etc., and even then to give another day or two between driers to all juicy plants, for fear of steaming them or boiling

Fernald — Injury to Herbarium-Specimens

them, if transferred to ventilators, by giving them too much heat while they were still actively sweating.

In recent studies I have had occasion to note the ill effects of too much heat applied to certain plants which are characterized by waxy coats or glaucous foliage. It is well known that the late Professor Karl M. Wiegand devised a carrying-rack for his presses, which he placed over the engine of his automobile. He thus was able to hasten the drying of specimens on long journeys. Similarly, the late Marie-Victorin and his associates dried their ventilated presses over artificial heat. Now, if one examines the specimens prepared by Victorin and his companions of *Salix glaucophylloides*, *Primula laurentiana* or *Mertensia maritima*, all of which are characterized by having a white bloom or a waxy coat on the leaf (on the lower surface in the *Salix* and the *Primula*) he will find this striking and diagnostic character melted off—the bloom of youth and naturalness is gone and the foliage has lost its original color. Similarly with Wiegand's material. In checking the specimens of *Magnolia virginiana* (*M. glauca*), which is characterized by the very white bloom of the lower leaf-surface, to see if there is any stability to the varieties of *M. glauca* proposed by Aiton and taken up by Pursh, I became impressed by the complete lack of bloom on the lower surfaces of several specimens from the Southeast, while others, like them in all other characters, had the white lower surface. Separating out the green-leaved specimens it was at once clear that they were all collected by Wiegand and Manning on their remarkably productive trip of the summer of 1927 from the Coastal Plain of Virginia to that of the Gulf.

Another point constantly noted, is that specimens too rapidly dried soon become brittle. They are easily fractured and in a few years make an unfavorable showing beside specimens carefully dried in the slower and more thorough period.

Since the above went into type I have received from the most careful maker of specimens, Mr. Bayard Long, the following note, which further emphasizes my last point. It is worth quoting.

> Your note on excessive heat in drying specimens is very much to the point and I hope it strikes home. I wish you would elaborate a bit more on the BRITTLENESS induced AND the inevitable lack of "fixing" of the specimens. This has been impressing me very strongly the past few

years, in material received from some of our local collectors. Of course it saves "busy" men much labor but it produces a very unsatisfactory grade of specimens. They get dried without even being examined again (while green and fresh) and, of course, there is no opportunity (if desire) to straighten leaves, draw flowers or fruit into view, or any of the other desirable "fixing" which results in good specimens. They become invariably badly wrinkled (often with leaves crumpled across the stems) and so brittle that the first handling starts their disintegration, a process greatly accelerated by mounting and surely continuing to the end of their existence. Foliage nice and *green* BUT only fragments remaining!

It is evident that we must remember the old saying, that "haste makes waste".—M. L. FERNALD.

BINGHAM'S FLORA OF OAKLAND COUNTY, MICHIGAN.—This flora may stand as a rather successful example of what is sometimes called humanized science—non-technical and pleasantly written exposition with a solid core of observation and knowledge. It is an account of the vascular vegetation of a county in southern Michigan from an ecological point of view. It accomplishes the somewhat unusual feat of defining intelligibly numerous plant associations without the use of a single Latin name. Details—such as species of *Carex* and *Juncus*—are filled in by a list of all species known or reported to occur in the county, with the associations in which each is found. In this list, naturally, Latin names are used—mostly those from the seventh edition of Gray's Manual, with occasional interpolation of the results of later studies.

Some items in the list seem to need verification. I know of no evidence that "*Aspidium spinulosum* var. *dilatatum* forma *anadenium*", for instance, occurs in Michigan except in the extreme north (old reports of this cannot be relied upon); and *Vaccinium arboreum* appears to be an unorthodox extension of range from the Mississippi Embayment. Nevertheless, the list shows plain evidence of care in preparation and (in spite of some misprints) attention to technical detail; and it is backed by specimens at the Cranbrook Institute.

The Flora is well printed and well illustrated; it will have real usefulness for anyone interested in the flora of Michigan.[1]—C. A. WEATHERBY.

---

[1] BINGHAM, MARJORIE T. The Flora of Oakland County, Michigan: a study in Physiographic Plant Ecology. Cranbrook Institute of Science, Bulletin no. 22. May, 1945. 155 pp., 30 ill., maps. $1.00 at the Institute, Bloomfield Hills, Michigan.

Volume 47, no. 559, including pages 221–236 and plates 912–944, was issued 10 July, 1945.

RATES FOR SPECIAL NUMBERS OF RHODORA

Many of the single numbers can be supplied only at special prices, as follows:

Vol. 12, no. 134: 50c
no. 138: 45c

Vol. 13, no. 151: 70c

Vol. 14, no. 163: 60c

Vol. 15, no. 171: 45c

Vol. 16, no. 182: 45c

Vol. 17, no. 193: 45c

Vol. 18, no. 205: 50c

Vol. 19, no. 224: 45c
no. 225: 50c

Vol. 21, no. 241: 45c
no. 243: 45c

Vol. 23, no. 265: 45c
no. 268: 45c
no. 269: 45c
no. 270: 45c
no. 271: 45c
no. 274: 45c
no. 275: 45c

Vol. 24, no. 279: 45c
no. 283: 45c

Vol. 25, no. 296: 45c

Vol. 26, no. 304: 50c
no. 305: 60c
no. 306: 45c

Vol. 28, no. 331: 45c
Vol. 92, no. 346: 45c
Vol. 30, no. 351: 50c
no. 356: 45c
no. 357: 45c

Vol. 31, no. 364: 50c
no. 369: 50c
no. 370: 50c

Vol. 32, no. 376: 45c
no. 382: 50c
no. 383: 45c

Vol. 33, no. 386: 60c
no. 388: 45c
no. 389: 45c
no. 391: 45c

Vol. 34, no. 403: 45c
no. 407: 45c

Vol. 35, no. 410: 50c
no. 418: 50c
no. 419: 50c

Vol. 36, no. 425: 55c
no. 426: 50c
no. 429: 70c
no. 430: 55c

Vol. 37, no. 435: 60c
no. 436: 70c
no. 437: 50c
no. 439: 60c
no. 440: 60c
no. 441: 50c
no. 443: 55c
no. 444: 55c

Vol. 38: no. 445: 50c
no. 448: 70c
no. 450: 70c
no. 455: 55c
no. 456: 50c

Vol. 39, no. 458: 50c
no. 463: 55c
no. 464: 75c
no. 466: 55c

Vol. 40, no. 471: 55c
no. 476: 50c
no. 477: 55c
no. 478: 60c
no. 479: 55c

Vol. 41, no. 482: 55c
no. 486: 55c
no. 487: 50c
no. 488: 60c
no. 489: 95c
no. 490: 50c
no. 491: 50c

Vol. 42, no. 499: 50c
no. 500: 60c
no. 502: 50c
no. 503: 70c

Vol. 43, no. 509: 50c
no. 512: 50c
no. 513: 50c
no. 514: 70c
no. 515: 75c

Vol. 44, no. 520: 70c
no. 525: 75c
no. 526: 75c
no. 527: 70c
no. 528: 60c

Vol. 45, no. 531: 60c
no. 532: 55c
no. 533: 55c
no. 534: 75c
no. 535: 70c
no. 538: 85c
no. 539: 75c
no. 540: 75c

Vol. 46, no. 542: 50c
no. 544: 60c
no. 545: 55c
no. 546: 55c
no. 547: 50c
no. 548: 45c
no. 550: 55c
no. 551: 55c
no. 552: 50c

DUPLICATE BOOKS FOR SALE

Brendel, F. Flora Peoriana; the vegetation in the climate of middle Illinois. Peoria, 1887. Limp cloth	$1.50
Caruel, T. Statistica Botanica della Toscana . . . studi sulla distribuzione geografica delle piante Toscane. Firenze, 1871. 375 pp., 1 colored plate. Half russia, slightly rubbed.	$2.50
Clute, W. N. Our Ferns in their Haunts. New York, 1901. xii + 332 pp., 8 colored plates, many black and white pls. and figs. Cloth.	$2.00
Gray, A. List of the Writings of Dr. Asa Gray. Chronologically arranged, with an Index. 1888. 68 pp.	$ .50
Harvey, W. H. Nereis Boreali-Americana. Pt. 1, Melanospermae, 149 pp., 12 pls. (1851) and Pt. 2, Rhodospermae, 258 pp., 24 pls. (1853), bound together. Washington (from Smithsonian Contributions to Knowledge, vols. III and V). Quarto. Cloth, somewhat broken at back.	$5.00
Hervey, A. B. Observations on the Colors of Flowers. New Bedford, 1899. 105 pp., 4 figs. Bound with: Observations on the Colors of Leaves. New Bedford. 1901. 43 pp. Cloth, paper sides.	$1.00

Prices include cost of transportation in U. S. A.

Address Librarian,
GRAY HERBARIUM OF HARVARD UNIVERSITY
79 Garden St., Cambridge 38, Mass.

CARD-INDEX OF NEW GENERA, SPECIES AND VARIETIES OF AMERICAN PLANTS

For American taxonomists and all students of American plants this is the most important supplement to the Index Kewensis. A work of reference invaluable for larger herbaria, leading libraries, academies of sciences and other centers of botanical activity. It includes genera and species from 1885 to date. The subdivisions of species from 1885 to date are now included and from 1753 to 1886 are in the process of being inserted. Issued quarterly, at $22.50 per thousand cards. Sets of the past issues can now be supplied only in negative photostats.

GRAY HERBARIUM of Harvard University,
Cambridge 38, Mass., U. S. A.